Custodian Accounting of Electronic Mortgage

Section 1: Summary

Use Case Summary			
Use Case ID:	FIN-001	**Use Case Type:**	Vertical
Submission Date:	December 28, 2018	**Is Use Case supporting SDGs**	Yes
Use Case Title:	Custodian accounting of electronic mortgage	**Domain:**	List 8 Appendix 2
Status of Case	Pilot	**Sub-Domain**	1. Finance a. Financial management & accounting b. interbank payments c. Reduction of Fraud d. Financial messaging e. Asset lifecycles and history
Contact information of person submitting/ managing the use-case	Full Name: Dergachev Ivan Job Title: Project manager, Fintech Association E-mail address: ivan.dergachev@fintechru.org Telephone number: +7 926 773 77 74 Full Name: Alexander Chuburkov Job Title: Expert GOST R * Russian TC 26 Cryptography and security mechanisms * ISO TC 307 Blockchain & DLT * Fintech Association (RUS) * Chair WG4 FG DLT ITU-T E-mail address: chuburkovalex@gmail.com Telephone number: +7 965 336 62 92		
Proposing Organization	Fintech Association Address: 4 Shlyuzovaya Embankment, Moscow, 115114, Russia Web site: http://fintechru.org/		
Short Description	Masterchain is a P2P-network with access control. The communications between the nodes of this network are based on the modified Ethereum protocol. Masterchain provides for safe record of information in a distributed ledger. The copies of this ledger are kept at each node of the network. Here you can see the white paper of the Masterchain: http://fintechru.org/documents/Masterchain_whitepaper_v1.1_en.pdf		
Long description	**Masterchain is:** • System using blockchain, hierarchical, with a restriction on the addition of information; • Ledger type is replicated;		

- Financial organization included in the Masterchain-authorized user of the information system, which can be both a user-validator (confirming the creation of a new block) or a user-controller, and as a result of the consensus procedure - user-registrar of the information system;
- Conventional unit (token) - technological units of account/ specialized units of account;
- User-registrar's resource - the computing power of the node (pool) of the user-registrar, expressed in the number of calculations of the hash function per second.
- Type of consensus procedure - PoW.

Decentralized Depository system is a platform implemented in the Masterchain.
  - Decentralized Depository system including electronic mortgages aims to combine the accounting systems of the depositories of the Russian Federation in the unified ledger . The DDS application is part of the initiative, which aims to translate the entire process of buying property from the selection of the object to the registration of mortgages and obtaining rights to real estate in the "online" and to make maximum transparency at all stages.
  - DDS provides depositaries with the ability to perform the functions of storage and (or) accounting and confirmation of rights to electronic mortgagees to owners of mortgages or other persons exercising rights to electronic mortgages, conducting Depository operations, ensuring the accounting of mortgage parameters, as well as receiving reports on the status of mortgage registration in the Depository at any time.
  - DDS allows exchanging information messages between depositories, including orders, keeping records of electronic mortgages on accounts provided by the Bank of Russia acts, storing files of electronic mortgages, as well as documents that can be created/issued in pursuance of electronic mortgages.
  - Is necessary for conducting Depository accounting of electronic mortgages in connection with changes in the legislation of Russia, which introduces the concept of electronic mortgages - a non-documentary security, the rights of which are fixed in the form of an electronic document signed by an enhanced qualified electronic signature, which is stored in the Depository, in accordance with article 13.2 of the Federal law of 25.11.2018 No. 328-FL.

General principles of Depository accounting in DDS:
- Depository accounting of mortgage certificates is in pieces.
- Mortgages on Deposit accounts are accounted for on a double entry basis (in accordance with clause 5.1. Bank of Russia Regulation No. 503-P). Each mortgage in the Depository account must be recorded twice: once in the passive account and once in the active account for mortgages recorded in the Depository, the balance must be kept: the total number of mortgages recorded in the passive accounts of the depot must be equal to the total number of mortgages recorded in the active accounts.
- Depository operations are carried out on the principle of "two hands": the operator (it is possible to use the "technical user" in the system) and the controller.
- It is not allowed to have a negative balance of mortgages recorded on the depot account.

	Document accounting system: • A system of accounting for documents related to Depository accounting, as well as documents related to the storage, recording and transfer of rights to electronic mortgages should be organized within the framework of the DDS. Records of documents that have been received (incoming documents) or sent (outgoing documents) by the Depositary shall be accessible. • Document accounting system may include software hardware designed to generate, send and receive electronic documents.
SDG in Focus (when applicable)	

Value Transfer:	Reduce of the mortgage business process costs by 30%	**Number of Users:**	*10*

Types of Users:	**Business roles of DDS users:** • Record-keeping Depository - the Depository carries out the storage of the mortgage, that is, performs the function of storage information contained in the electronic mortgage and agreements to the electronic mortgage, as well as interaction with Rosreestr during registration, amendments in the mortgage, cancelling the mortgage. • Record-entry Depository - depositary carrying out accounting and transfer of mortgage rights. Does not store the mortgage, provides services for the accounting and transfer of rights for the mortgage. • Role combining the roles of the Depositary of storage and Depository of accounting rights.
Stakeholders	Fintech Association, Banks.
Data:	There are two different kinds of data stored in Masterchain. The first is open data, that is stored in ledger and is available for all users in network. The second type is confidential data. It is stored in special storage. Access rights to confidential data are configured in smart-contract called "Role Model".
Identification:	Addresses in network are calculated using certified cryptographic methods. These addresses within roles and access rights of users are stored in special smart-contract called "Whitelist". Each operation in network should pass an authorization using this contract.
Predicted Outcomes:	• Elimination of the risks inherent in a paper mortgage: the risks of loss of the mortgage and the need for a procedure for the mortification of rights under the lost mortgage. • Increasing transparency of interaction between mortgage market participants and regulators. • Acceleration of securitization: the process of portfolio valuation and sale of the fixed volume of mortgages.

Overview of the Business Problem or Opportunity
The objectives of the project: • Switching from paper documents to digital form due to Russian law   • Optimization of the business process by dint of DLT

- Simplification of the procedure of securitization

For all participants of the business process it means a significant reduction of time (in 3-5 times). Process reduces the risk of falsification of the document. For Depository, it means a reduction of operating costs by 30% and simplification of furnishing of documents for the Regulator.The process of document verification is simplified for the Regulator.

Why Distributed Ledger Technology?

The Blockchain and smart-contracts make this interaction trustworthy, transparent and understandable. The implementation of DLT solution, which allows tracking electronic mortgages, can eliminate paperwork and shorten the time of transaction.

Section 2: Current process

Current Solutions

Documents exist in paper form.

| **Existing Flow (as-is)**		
Step	**User Actions**	**System Actions**
1.	Mortgage servicing	n/a
2.	Record-entry Depository receiving/sending information about the mortgage	n/a
3.	Mortgage expired	n/a

Process scheme (as-is)
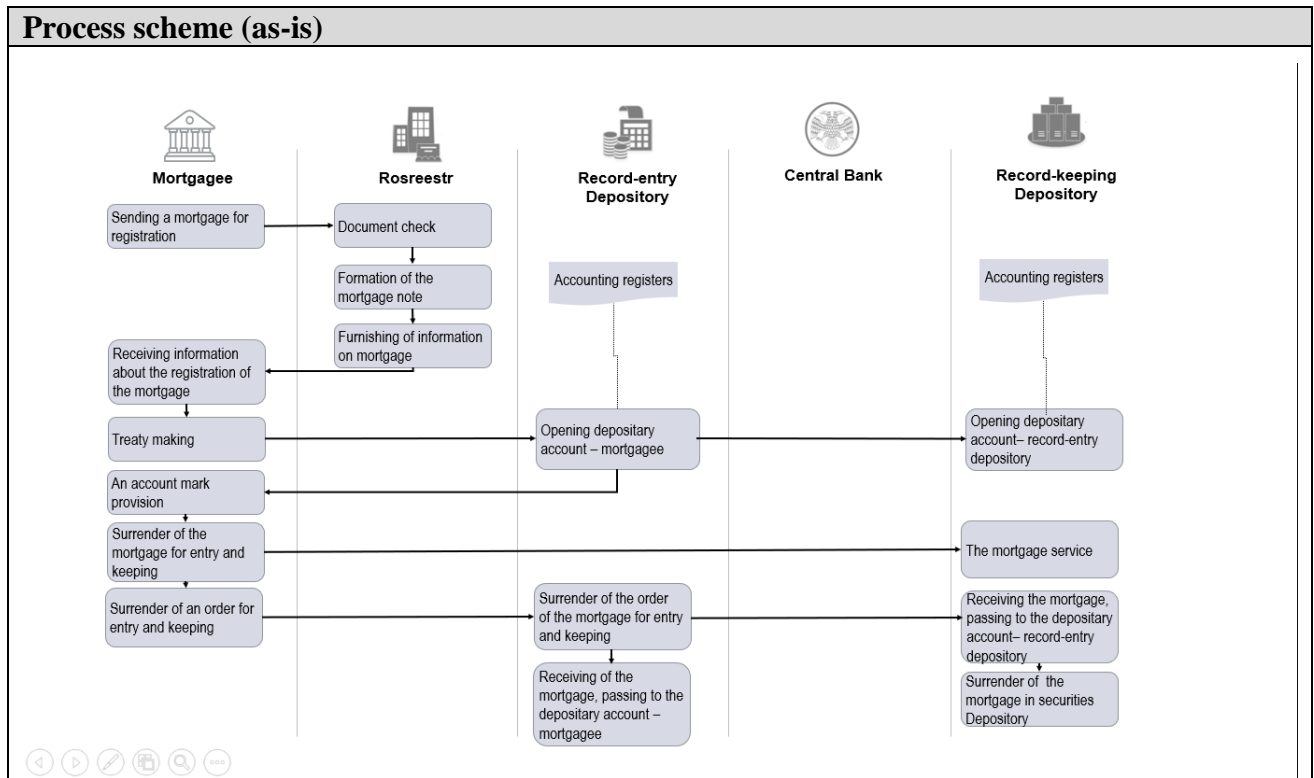
Data and information (as-is)

Data	Type	Description
1	Documents	Mortgage, agreements
2	Payment transactions	Payment of the fee

Participants and their roles (as-is)

Actor	Type/Role	Description
1	Mortgagee	Pledge holder
2	Rosreestr	Federal executive authority
3	Record-entry Depository	Participant of the securities market
4	Record-keeping Depository	Participant of the securities market
5	Central Bank	Central Bank of Russian Federation, Regulator

Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
1	Mortgagee	Pledge holder
2	Rosreestr	Federal executive authority
3	Record-entry Depository	Participant of the securities market
4	Record-keeping Depository	Participant of the securities market
5	Central Bank	Central Bank of Russian Federation, Regulator

Section 3: Expected process

	Expected Flow (to-be)	
Step	**User Actions**	**System Actions**
1.	Mortgage servicing	System writes smart contract to the blockchain and save the contract to the distributed storage
2.	Depositary validates mortgage data from the blockchain and the distributed storage	System marks the smart contract and the contract from the distributed storage as validated by Depositary
3	Receiving/sending information about the mortgage	System marks the smart contract as active
4	The extension of the mortgage	System marks the smart contract as active. System saves hash of the documents to the blockchain and the consignment to the distributed storage
5	Changing conditions of the mortgage	System saves the data into distributed storage and blockchain
6	Mortgage expired	System finalizes the smart contract

Process scheme (to-be)
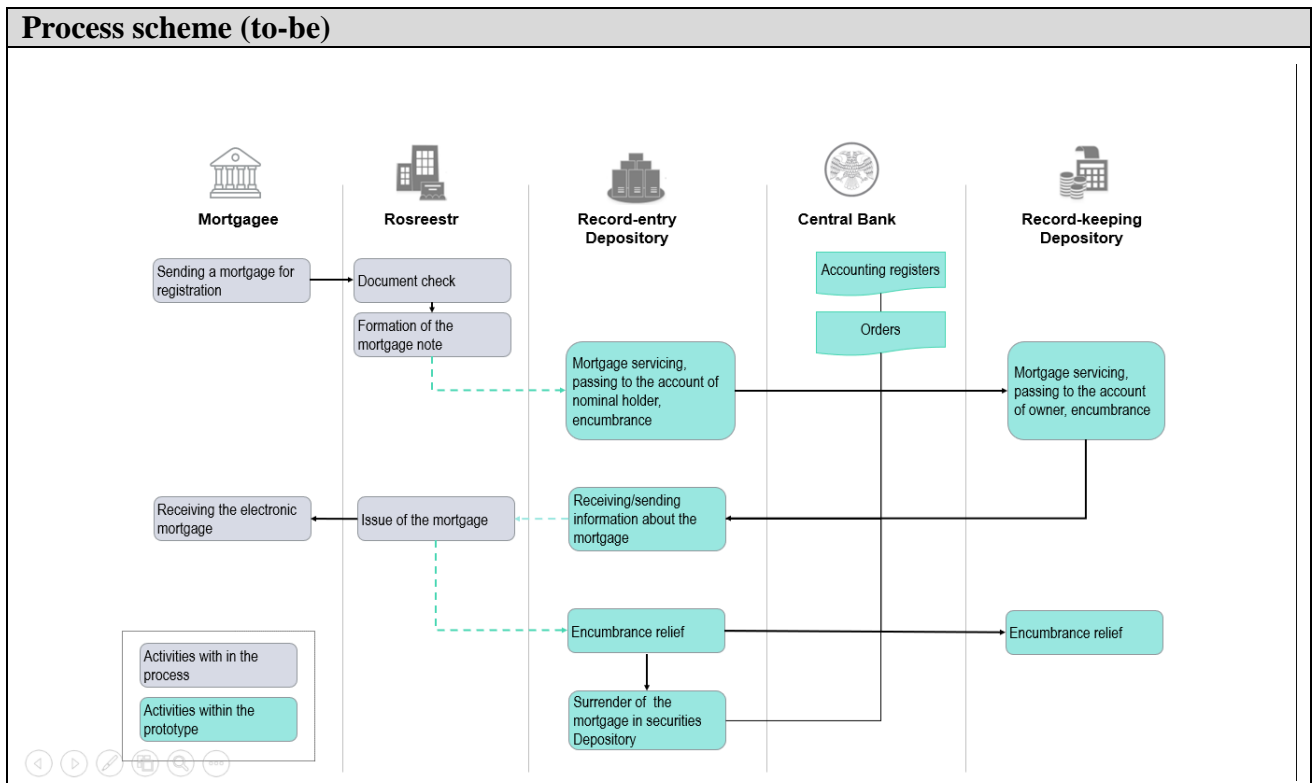
	Participants and their roles	
Actor	**Type/Role**	**Description**
1	Mortgagee	Pledge holder

Participants and their roles		
Actor	**Type/Role**	**Description**
2	Rosreestr	Federal executive authority
3	Record-entry Depository	Participant of the securities market
4	Record-keeping Depository	Participant of the securities market
5	Central Bank	Central Bank of Russian Federation, main top-tier Bank

Data and information		
Data	**Type**	**Description**
1	Documents	Documents hashes exchange in DLT-network
2	Payment transactions	Payment of the fee

Security and privacy
1. The mortgage conditions should be confidential to other blockchain network participants. 2. DLT-system should be able to provide mechanisms of mortgage documents and payments data integrity control; 3. Mortgage documents and payments data and related services (System Actions) should be available in 24/7/365 mode.

Main Success Scenario + expected time line
1.   Mortgage comes into force; 2.   Mortgage conditions adhered; 3.   Mortgage expired.

Conditions (pre- or post-)
1. All parties are connected to DLT-network

Performance needs
1. Volume of transactions > 700 Tx/day. 2. Network participants > 150

Legal considerations
Switching from paper documents to digital form.

Risks

1. Legal risks;
2. Security risks;
3. Risks related to DLT immaturity.

External References and Miscellaneous

GOST R 34.11-2012 (Streebog);

GOST R 34.10-2012;

GOST 28147-89 (Magma);

Appendix 1:
Domains and subdomains for use cases categorization

Vertical:

2. Finance
    a. Financial management & accounting
    b. International & interbank payments
    c. Clearing and settlement
    d. Reduction of Fraud
    e. Financial messaging
    f. Asset lifecycles and history
    g. Trade finance
    h. Regulatory compliance & audit
    i. AML/KYC
    j. Insurance
    k. Peer-to-peer transactions
3. Healthcare
    a. Pharma
    b. Biotechnology
    c. Medicine
4. Industries
    a. Manufacturing
    b. Energy
    c. Chemical
    d. Retail
    e. Real estate
    f. IT and telco
    g. Supply chain management
    h. Transportation
    i. Agriculture
5. Government and public sector
    a. Taxes
    b. Government and non-profit transparency
    c. Legislation, compliance & regulatory oversight
    d. Voting
    e. Taxation and customs
    f. Intellectual property management
    g. Land Registries

Horizontal:

1. Identity management
2. Security management
    a. Public Key Infrastructure
3. Internet of Things

4. Data processing, storage and management
    a. Data Validation (includes provenance)

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Digital Letter of Credit

Section 1: Summary

| Use Case Summary			
Use Case ID:	FIN-002	**Use Case Type:**	Vertical
Submission Date:	December 28, 2018	**Is Use Case supporting SDGs**	Yes
Use Case Title:	Digital Letter of Credit	**Domain:**	List 8 Appendix 2
Status of Case	*Pilot*	**Sub-Domain**	1. Finance a. Financial management & accounting b. International & interbank payments c. Reduction of Fraud d. Financial messaging e. Asset lifecycles and history f. Trade finance g. AML/KYC
Contact information of person submitting/ managing the use-case	Full Name: Dergachev Ivan Job Title: Project manager, Fintech Association E-mail address: ivan.dergachev@fintechru.org Telephone number: +7 926 773 77 74 Full Name: Alexander Chuburkov Job Title: Expert GOST R * Russian TC 26 Cryptography and security mechanisms * ISO TC 307 Blockchain & DLT * Fintech Association (RUS) * FOCUS GROUP DLT ITU-T E-mail address: chuburkovalex@gmail.com Telephone number: +7 965 336 62 92		
Proposing Organization	Fintech Association Address: 4 Shlyuzovaya Embankment, Moscow, 115114, Russia http://fintechru.org/		
Short Description	Development and implementation of a software package to opening and implementation of a digital letter of credit based on a distributed ledger platform.		
Long Description	**The goals of the project** are the creation and implementation of the application, improvement of legal regulation of digital letter of credit. **The objectives of the project are:**		

	- *the formation of requirements and hypotheses for testing* (business requirements, functional requirements, hypothesis for testing on the prototype of the system, the target scheme of the system node and integration requirements); - *the development of a prototype system* (the prototype system, the test system prototype, the testing protocols of the prototype system); - *the* development of the pilot system and its integration with external systems (the pilot system, the script /test reports of the pilot system, reports on the testing of hypotheses, the program of activities/reports on the readiness of the transition to experimental-industrial exploitation system); - the introduction of the system/launch of the pilot (reports on the results of the commercial operation system, acts of transition to the commercial operation system, plan / report on the distribution of the system); - *the identification of obstacles/opportunities to improve the base of the regulatory legal act for digital letter of credit, the preparation of proposals and the organization of their adoption* (a list of regulatory legal act in digital credit for development/change, proposals in digital credit for the enactment of the PPA digital credit enacted). **Projected effect:** - reduction the duration of information exchange processes from 4 days to 0.5 days; - reduction of labor costs of the Bank's involved employees - up to 20%;

SDG in Focus (when applicable)			
Value Transfer:		**Number of Users:**	10
Users:	Exporters, Importers, Banks, Shipping companies		
Types of Users:	Buyer, Buyer's Bank, Supplier's Bank, Supplier.		
Stakeholders	Exporters, Importers, banks		
Data:	Electronic documents, accounts in DLT		
Identification:	Full identification of participants required		
Predicted Outcomes:	Automation of document and supply tracks involved into a Letter of Credit implementation. Reduction in the term of implementation of a letter of credit with a 15 days' cover.		

Overview of the Business Problem or Opportunity

The letter of credit transaction may involve a large number of participants of the business process that do not know and do not trust each other.

The first stage of project addresses the issue of eliminating paper work, by shifting it into digital form. At the second stage, it is expected to transfer payments between the counterparties using digital currency (CBDC).

The objectives of the project-automation of document flow, which are involved in the design of the letter of credit; eliminate paperwork and related time delays in the application of transactions.

Paper work elimination could be possible solution to problem of distributed data storage.

For customers it means significantly reduced time for registration and processing of documents (from 10 days to 4 hours). For Banks it means that they will be able to reduce transaction costs for processing transactions.

Project boundary:

Start: the buyer forms a business documents for issuance of the letter of credit (the condition of the contract for a bargain).

End: the buyer and the supplier are notified of the payment of the transaction.

Why Distributed Ledger Technology?

The Blockchain and smart-contracts make this interaction trustworthy, transparent and understandable for each one of them. The implementation of DLT solution, which allows tracking paid LoC issuance, can eliminate paperwork and shorten the time of transaction.

Section 2: Current process

Current Solutions

Documents exist in paper form; funds are transferred by corresponding bank.

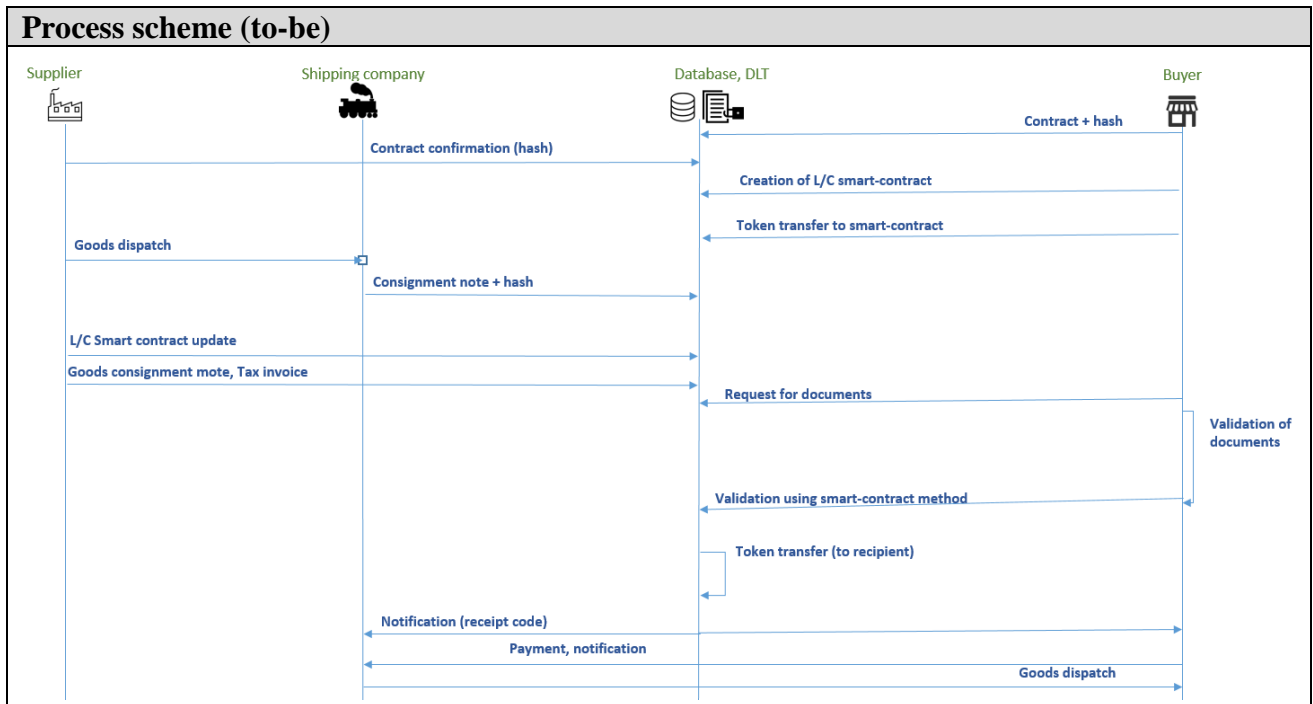| **Existing Flow (as-is)**		
Step	**User Actions**	**System Actions**
1.	Importer contacts bank for a LoC issuance	n/a
2.	Importer's bank checks if Importer is able to pay for goods	n/a
3.	Exporter receives LoC and checks that it matches with the contract	n/a
4.	Once the goods have been shipped, the Importer's bank pays to Exporter	n/a

Process scheme (as-is)
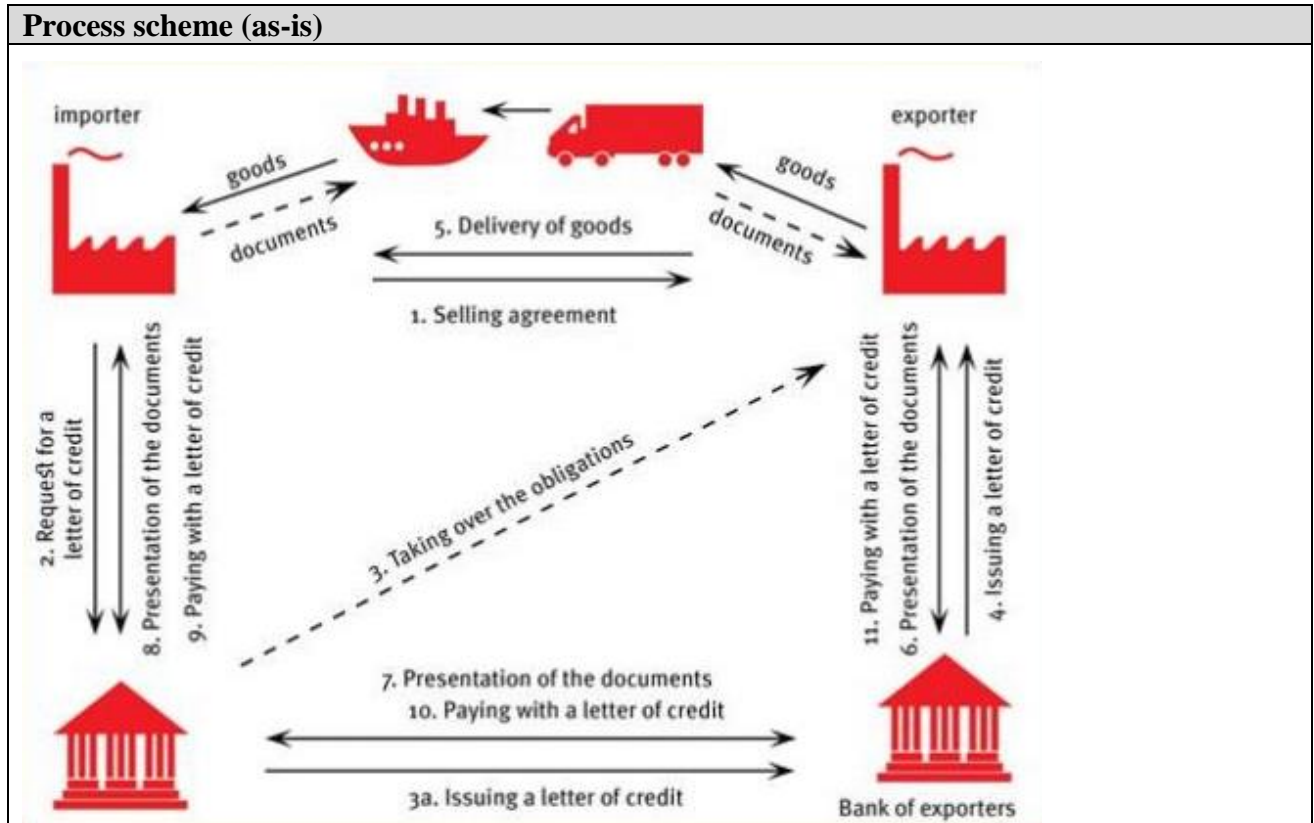
Data and information (as-is)		
Data	**Type**	**Description**
1	Documents	Documents (Contract, Letter of credit, Transportation documents, Agreements)
2	Payment transactions	Letter of Credit payments

Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
1	**Exporter**	Supplier of goods or services
2	**Exporter's bank**	Bank of supplier (letter of credit issuance)
3	**Importer**	Consumer of goods or services
4	**Importer's bank**	Bank of consumer (letter of credit payments)
5	**Shipping company**	The companies which delivers and stores the goods to the Importer (contracts and other documents validation, consignment forming, shipment)

Section 3: Expected process

Step	User Actions	System Actions
Expected Flow (to-be)		
1.	The Importer writes Contract`s public hashes to the blockchain and Contract's private data to the distributed storage	The System writes the smart contract to the blockchain and saves files with private data to the distributed storage
2.	The Exporter uses Contract's public identifiers and his private keys to access and validate the Contract's data	Marks the smart contract state and/or files in the distributed storage as validated by the Exporter
3	The Importer deposits tokens in amount specified in the Contract	Increases tokens amount on the account of smart-contract
4	The Exporter handles goods to the shipping company, the shipping company writes hash of the goods consignment to the blockchain and the private goods consignment to the distributed storage	Saves hash of the goods consignment to the smart contract and private consignment files to the distributed storage
5	The Exporter writes private goods consignment notes and Tax invoice to the distributed storage and their hashes to the blockchain	Saves the data into distributed storage and blockchain
6	The Importer validates the goods consignment	Marks the goods consignment as validated by the Importer and the smart contract sends tokens to the Exporter's account
7	Informing the shipping company about tokens sent to the Exporter account.	Shipment of goods to the Importer.

Process scheme (to-be)

Supplier — Shipping company — Database, DLT — Buyer

- Contract + hash
- Contract confirmation (hash)
- Creation of L/C smart-contract
- Token transfer to smart-contract
- Goods dispatch
- Consignment note + hash
- L/C Smart contract update
- Goods consignment mote, Tax invoice
- Request for documents
- Validation of documents
- Validation using smart-contract method
- Token transfer (to recipient)
- Notification (receipt code)
- Payment, notification
- Goods dispatch

Participants and their roles		
Actor	**Type/Role**	**Description**
1	Importer	The Importer of the goods
2	Exporter	The Exporter of the goods
3	Shipping company	The companies which delivers and stores the goods to the Importer (contracts and other documents validation, consignment forming, shipment)

Data and information		
Data	**Type**	**Description**
1	Documents	Documents' hashes exchange in DLT-network
2	Payment transactions	Letter of Credit payments

Security and privacy

1. The contract conditions and payment transactions should be confidential to other blockchain network participants;
2. DLT-system should be able to provide mechanisms of L/C documents and payments data integrity control;
3. L/C documents and payments data and related services (System Actions) should be available in 24/7/365 mode.

Main Success Scenario + expected time line
1. All information exchange and payments occur in Distributed Ledger in automatic mode; 2. Payments are transferred using digital currency (CBDC).

Conditions (pre- or post-)
All parties are connected to DLT-network

Performance needs
1. Payment transactions processing (near real time, 24/7/365) 2. Volume of transactions > 700 Tx/day. 3. Network participants > 150

Legal considerations
Eliminating paper documents shifting them to digital form.

Risks
1. Legal risks, including regulation of CBDC and cryptocurrencies, documents in digital form; 2. Security risks; 3. Risks related to DLT immaturity.

Special Requirements
Hypotheses are tested in the framework of the implemented functional prototype Digital letter of credit system. The buyer and the supplier of the customers of one Bank (buyer's Bank=supplier's Bank), connected or have access to the digital letter of credit system

Appendix 1:
Domains and subdomains for use cases categorization

Vertical:

2. Finance
    a. Financial management & accounting
    b. International & interbank payments
    c. Clearing and settlement
    d. Reduction of Fraud
    e. Financial messaging
    f. Asset lifecycles and history
    g. Trade finance
    h. Regulatory compliance & audit
    i. AML/KYC
    j. Insurance
    k. Peer-to-peer transactions
3. Healthcare
    a. Pharma
    b. Biotechnology
    c. Medicine
4. Industries
    a. Manufacturing
    b. Energy
    c. Chemical
    d. Retail
    e. Real estate
    f. IT and telco
    g. Supply chain management
    h. Transportation
    i. Agriculture
5. Government and public sector
    a. Taxes
    b. Government and non-profit transparency
    c. Legislation, compliance & regulatory oversight
    d. Voting
    e. Taxation and customs
    f. Intellectual property management
    g. Land Registries

Horizontal:

1. Identity management
2. Security management
    a. Public Key Infrastructure
3. Internet of Things

4. Data processing, storage and management
    a. Data Validation (includes provenance)

Digital Bank Guarantee

Section 1: Summary

Use Case Summary			
Use Case ID:	FIN-003	**Use Case Type:**	Vertical
Submission Date:	December 5, 2018	**Is Use Case supporting SDGs**	Yes
Use Case Title:	Digital Bank Guarantee	**Domain:**	List 6 Appendix 2
Status of Case	Pilot	**Sub-Domain**	Financial
Contact information of person submitting/ managing the use-case	Full Name: Dergachev Ivan Job Title: project manager E-mail address: ivan.dergachev@fintechru.org Telephone number: +7 926 773 77 74 Full Name: Alexander Chuburkov Job Title: Expert GOST R * Russian TC 26 Cryptography and security mechanisms * ISO TC 307 Blockchain & DLT * Fintech Association (RUS) * FOCUS GROUP DLT ITU-T E-mail address: chuburkovalex@gmail.com Telephone number: +7 965 336 62 92		
Proposing Organization	FinTech Association Address: 4 Shlyuzovaya Embankment, Moscow, 115114, Russia http://fintechru.org/		
Short Description	Development and implementation of a software package for the organization of work with Digital Bank guarantees (DBG) based on the distributed ledger platform (blockchain platform "Masterchain").		
Long description	The market is ready to move from paper bank guarantees to digital ones, and it has already come to the realization that the digitization of paper documents and further work with digital copies of paper documents is a non-optimal approach and it is necessary to move to a system where the digital document will be primary; The potential availability of CBG solutions currently being developed by individual Banks is limited to the clients of the respective Bank, which reduces the possible effect of their implementation (the Buyer and the Seller, as residents of the Russian Federation, are not always clients of the same Bank). The System (solution, set of services) developed in the project is an interbank platform that is not tied to one Bank and, therefore, is devoid of the mentioned restriction. **Project goals:**		

	• Creation and implementation of the System • Improvement of legal regulation of CBG **Project objective:** • Generation of requirements and hypothesis to test • Development of a prototype System and test the hypothesis • System pilot development and integration with "external" systems • System implementation/Start-up of pilot **Key assumption:** • the technological platform for the project implementation is the infrastructure of the distributed Masterchain network, which includes the functionality for its administration and support of the role model of the system participants, • technological implementation of the system involves two stages: 1) creation of a prototype System and 2) creation of a pilot System, • openID Connect 1.0 is proposed as a technology for authorization of users of the developed system (user ID is signed by the authorization center, and can also be signed by the client in the browser through the EDS plug-in), • to store scans of documents (accompanying release, entry into force, change of conditions, termination of the warranty, etc.), it is planned to use a local document Storage integrated with the node of the distributed Masterchain network. **Beyond the scope of the project** • Approval by the Principal and the Bank of the conditions for issuing a Bank guarantee, • Verification of the conditions for the entry into force of the Bank guarantee (except for the agreed date), • Check the conditions of termination of the Bank guarantee (except for the expiry of the guarantee), • Payment by the Principal of the Commission to the Bank for the issuance of a Bank guarantee, • Transfer of funds to the Beneficiary of the Bank guarantee when paying for it, • Integration with government agencies for the exchange of information on transactions with Bank guarantees.		
SDG in Focus (when applicable)			
Value Transfer:	Stage 1: no value transfer; Stage 2: payments in DLT allowed (CBDC)	**Number of Users:**	10
Types of Users:	Principal, Guarantor bank, Beneficiary.		
Stakeholders	Principal, Beneficiary, Bank. Central Bank as observer		

Data:	Electronic documents, such as BG and contract, accounts in DLT
Identification:	Full identification of participants required
Predicted Outcomes:	• Reduction of terms and reduction of costs to ensure document flow under Bank guarantees (According to Bain&Company, 2016, more than 50% of operating costs of banks to conduct transactions of Bank guarantees goes to the implementation of paper document flow). • Reducing the cost of storage and risks of loss of information on paper (Distributed ledger guarantees the technical safety of information on the documents). • Increasing the availability/reducing the time for obtaining information on the Bank guarantee and its status for all stakeholders through the use of a single information environment, in the future integrated with national electronic trading platforms.

Overview of the Business Problem or Opportunity
The objectives of the project: • Switching from paper documents to digital form   • Protection of confidential data by limiting the visibility of the issued document   For all participants of the business process it means a significant reduction of time (1-2 days). Process reduces the risk of falsification of the document, for economy that means increase of origin BG market. For banks, it means a reduction of operating costs by 10-15%. For Beneficiary, there is no reason to waste time on letters to Bank to verify authenticity of the issued bank guarantees. The process of document verification is simplified for the Regulator.

Why Distributed Ledger Technology?
The Blockchain and smart-contracts make this interaction trustworthy, transparent and understandable for each one of them. The implementation of DLT solution, which allows tracking paid bank guarantees, can eliminate paperwork and shorten the time of transaction.

Section 2: Current process

Current Solutions
Documents exist in paper form; funds are transferred by corresponding bank; procedure of verification of the BG is manual, confidential data of issued BG is not protected.

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
1.	Principal contacts bank for a BG issuance	n/a

Existing Flow (as-is)

Step	User Actions	System Actions
2.	Beneficiary receives BG and checks that it matches with the contract	n/a
3.	BG has expired	n/a

Process scheme (as-is)
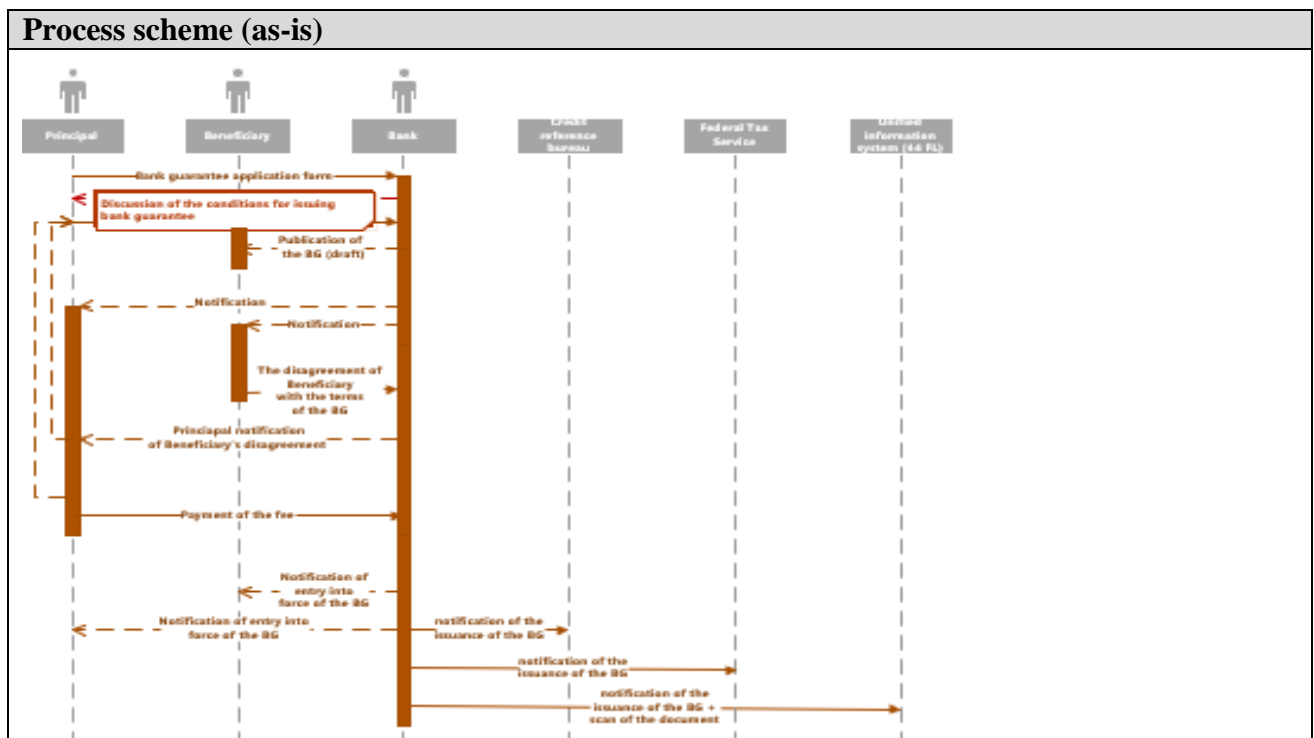
Data and information (as-is)

Data	Type	Description
1	Documents	Contract, bank guarantee, agreements
2	Payment transactions	Payment of the fee for issue of bank guarantee

Participants and their roles (as-is)

Actor	Type/Role	Description
1	Principal	Principal of bank guarantee
2	Beneficiary	Beneficiary of bank guarantee
3	Bank	Bank that issues the bank guarantee

Section 3: Expected process

Step	User Actions	System Actions
Expected Flow (to-be)		
1.	Bank writes BG`s data to the blockchain and the distributed storage	System writes smart contract to the blockchain and save the contract to the distributed storage
2.	Beneficiary validates BG`s data from the blockchain and the distributed storage	System marks the smart contract and the contract from the distributed storage as validated by the Beneficiary
3	BG comes into force	System marks the smart contract as active
4	The extension of the BG	System marks the smart contract as active. System saves hash of the documents to the blockchain and the consignment to the distributed storage
5	Changing conditions of the BG	System saves the data into distributed storage and blockchain
6	BG expired	System finalizes the smart contract

Process scheme (to-be)
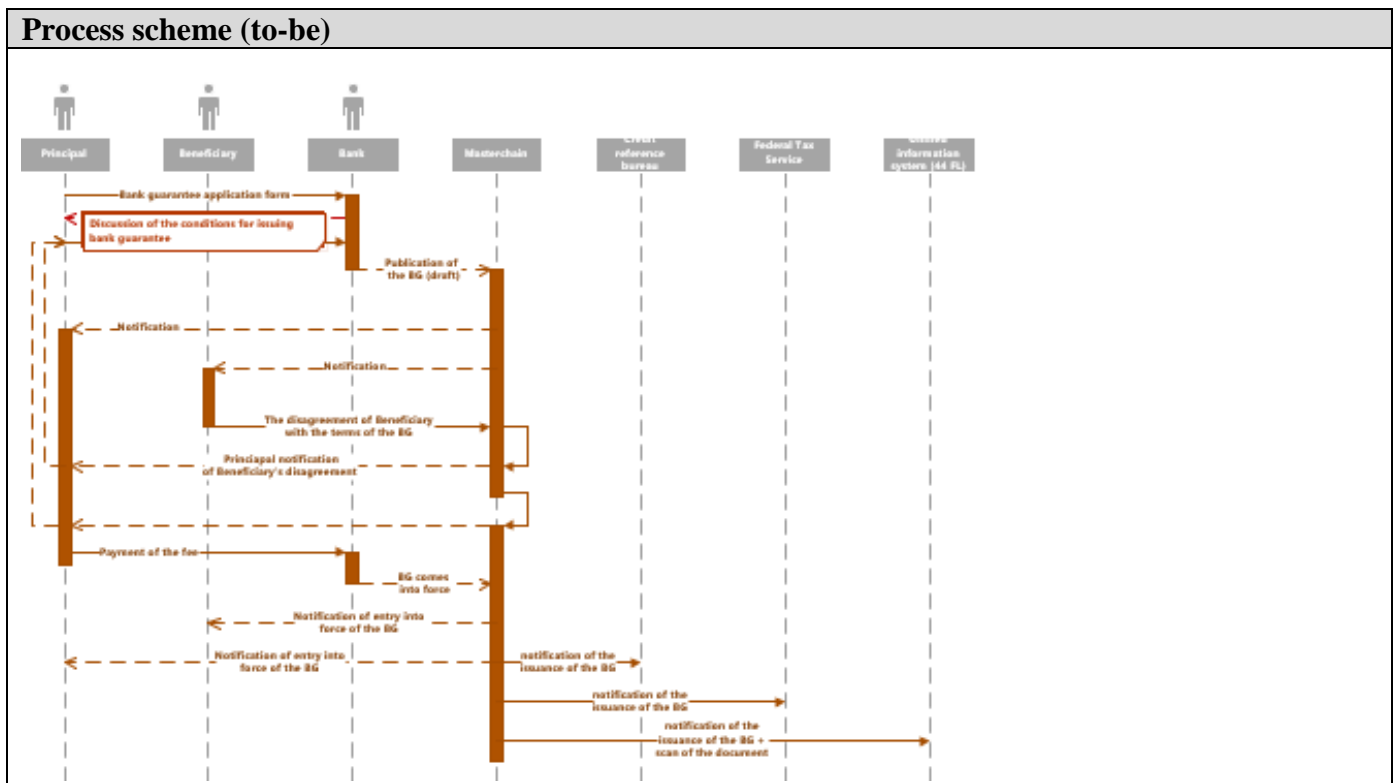
Participants and their roles		
Actor	**Type/Role**	**Description**
1	Bank	Bank that issues the bank guarantee
2	Principal	Principal of bank guarantee
3	Beneficiary	Beneficiary of bank guarantee

Data and information		
Data	**Type**	**Description**
1	Documents	Documents' hashes exchange in DLT-network
2	Payment transactions	Payment of the fee for issue of bank guarantee

Security and privacy

1. The bank guarantee conditions should be confidential to other blockchain network participants.
2. DLT-system should be able to provide mechanisms of BG documents and payments data integrity control;
3. BG documents and payments data and related services (System Actions) should be available in 24/7/365 mode.

Main Success Scenario + expected time line

1. Principal furnishes documents to Bank
2. Bank approvals loan
3. Principal accepts Bank conditions
4. Beneficiary accepts the text of BG
5. Principal pays fee
6. BG comes into force;
7. BG conditions adhered;
8. BG expired.

Conditions (pre- or post-)

All parties are connected to DLT-network

Performance needs

1. Volume of transactions > 700 Tx/day.
2. Network participants > 150

Legal considerations

Switching from paper documents to digital form

Risks

1. Legal risks;
2. Security risks;
3. Risks related to DLT immaturity.

Appendix 1:
Domains and subdomains for use cases categorization

Vertical:

1. Finance
   a. Financial management & accounting
   b. International & interbank payments
   c. Clearing and settlement
   d. Reduction of Fraud
   e. Financial messaging
   f. Asset lifecycles and history
   g. Trade finance
   h. Regulatory compliance & audit
   i. AML/KYC
   j. Insurance
   k. Peer-to-peer transactions
2. Healthcare
   a. Pharma
   b. Biotechnology
   c. Medicine
3. Industries
   a. Manufacturing
   b. Energy
   c. Chemical
   d. Retail
   e. Real estate
   f. IT and telco
   g. Supply chain management
   h. Transportation
   i. Agriculture
4. Government and public sector
   a. Taxes
   b. Government and non-profit transparency
   c. Legislation, compliance & regulatory oversight
   d. Voting
   e. Taxation and customs
   f. Intellectual property management
   g. Land Registries

Horizontal:

1. Identity management
2. Security management
   a. Public Key Infrastructure
3. Internet of Things

4. Data processing, storage and management
    a. Data Validation (includes provenance)

_____

88 InsurTech Insurance and BlockchAIn for Good

Section 1: Summary

Use Case Summary			
Use Case ID:	FIN-005	**Use Case Type:**	Vertical 1. Finance j Insurance Horizontal 1;3;4
Submission Date:	March 31, 2019	**Is Use Case supporting SDGs**	Yes
Use Case Title:	88 InsurTech Insurance and BlockchAIn for Good	**Domain:**	Finance
Status of Case	In Production (Live in BR)	**Sub-Domain**	Insurance
Contact information of person submitting/ managing the use-case	Full Name: **Rodrigo Messias Ventura** Job Title: **Founder and CEO** E-mail address: **ventura@88i.io** Telephone number: **+5511995555001** Social media: https://www.linkedin.com/in/rodrigoventura/ https://singularityuglobal.org/profile/rodrigo-ventura https://www.youracclaim.com/badges/41f84027-9eaf-4f80-a191-9a79f890f720/linked_in_profile https://courses.dcurr.unic.ac.cy/user/profile.php?id=18091 https://www.linkedin.com/company/11549784/admin/ https://www.facebook.com/88Insurtech.io/ https://twitter.com/88insurtech https://open.spotify.com/playlist/0oIkK6Y3icfFnBqwm3SWX2 https://www.youtube.com/channel/UC2AZZ_loumdrNsKz5jypBzQ https://github.com/88insurtech/ethereum https://github.com/88insurtech/hyperledger Web site: https://88i.io https://play.google.com/store/apps/details?id=io.insurtech88i		
Proposing Organization	Legal name, Country and national registration number (as applicable) 88 Insurtech Serviços Digitais e Intermediação Ltda., Av. Angélica, 2529 - Bela Vista São Paulo - SP, 01227-200 Brazil National Registration Number: CNPJ 29.846.286/0001-02 UNGM number: 551162		
Short Description	*88i is reinventing insurance, Uberizing the industry to democratize insurance, ultimately making it for free and promoting social impact at global scale.*		
Long description	88 INSURTECH is a startup company with a disruptive business model based in blockchain that revolutionize the insurance market. The company presents a cheaper, more practical, faster and more transparent way to buy and sell insurance. The interface is simplified by the use of a		

	digital platform (app) that gives full transparency to the consumer and operated in a 24/7 shift to guarantee a faster path to contract and acquire insurance. In exchange of a cash-back, 88i is planning to have the active support of its clients to sell insurance products. Without the standard physical costs of distribution, it is expected to reduce the insurance cost up to -30% and make insurance for free. Another important feature of the business model is the possibility to customize the product. On Demand Company has won an important blockchain competition in Brazil promoted by Google (Startup Weekend Blockchain TechStars) UNICEF has been shortlisted 88INSURTECH as a Blockchain Startup for Social Impact with Global Scale at the Innovation Fund. And UNGM has listed 88i as a SUPPLIER NUMBER 551162, Additionally 88i was approved by Singularity University at their Global Startup Program GSP.
SDG in Focus (when applicable)	*Enter one or more number (1-17) and specific corresponding indicator/s as applicable* *See https://www.un.org/sustainabledevelopment/sustainable-development-goals/* 1;2;3;4;5;8;10;11;17

Value Transfer:	*The solution allows to transfer any value (e.g. assets and or tokens, etc.)*	**Number of Users:**	*Over 1400 at the moment - We aim 1 Billion people*
Types of Users:	We are building ecosystems of protection in Mobility (Taxi, Car-sharing, Bikes, Scooters), Fintech (Digital Banking, Credit Lending) and Crypto/Fiat Exchanges		
Stakeholders	Drivers and Passengers - anyone who use a mobile phone		
Data:	The first step is to register a transaction as a time-stamp in a PKI to prove immutability. (refereeing to a PDF insurance policy) The second step is to register a series of events, related to the insurance policy. (Like sales commissions paid, register of co-insurance, reinsurance, FNOL) The third step would be a self executing policy in real time via a smart contract. (instant claim settlement) All personal data should be preserved outside the ledger complying with the PDGR. The ledger would have the information about the financial scope of insurance and what binary information should try to obtain from an oracle.		
Identification:	In the case of insurance, to be compliant with the insurance regulations, its necessary to have a KYC process during the app on-boarding. The client wants to identify him-self to be able to receive the insurance coverage.		
Predicted Outcomes:	We want to democratize insurance, making it more simpler, easier and cheaper, ultimately for free in a member-get-member process. And subsidize micro-insurance with traditional insurance premiums not claimed. Our purpose is to impact 1 billion people worldwide		

Overview of the Business Problem or Opportunity
The experience of buying insurance is awful, bureaucratic and time-consuming.
The millennial client of today represents 54% of the worlds population and demands experience via digital channels and mobile apps;
The blockchain technology has vanished from the map the only 2 main entrance barriers from the insurance market (Regulation and Capital Intensive via ICOs, STOs)
Tech GIANTS had entered into the insurance market like
Lemonade with Google Capital; Sequoia and SoftBank);
Acko with Amazon or
ZhongAn with Tecent, Alibaba and PingAn
The world has changed to customer centric and the insurance industry still only focus in the product and the distribution channel.
There is a unique opportunity now to reinvent insurance while at the same time bring social impact at global scale.

Why Distributed Ledger Technology?
The improvement would happen by transforming the whole management life-cycle of an insurance policy. From entrance by enabling clients to buy from an app but also in the instant claim settlement in real time.
Immutability, No Arbitrage, No conflict of interests, Full transparency, Solvency rules like Basileia, Sarbanes Oxley; Instant Claim Settlement

Section 2: Current process

Current Solutions
Tradicional Insurance carriers still remains with process from the industrial revolution. Everything is manual, burocratic, time-consuming, full of paper. The industry focus the distribution channel and the product, but not the customer. Furthermore is expensive and excludes a number of people from having a protection from when they most need it.
Brokers, also dont have interest to sell microinsurance. We are changing that for good.

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
1.	You have to search for a insurance broker	
2.	Once with the broker you have to ask for a quote	The assessment is perform by the broker in paper.

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
3.	Do simulations	Simulations are made manually with a printed price / fator table
4	Get a quote	A quote than is provided by the broker to the client in paper
5	Ask to a proposal	The client verify the price; Accept the price and than ask the broker to fomalizing to the insurer his proposal
4.	Insurer Acceptance	There is no garante that your proposal is going to be accepted by the insurer. In fact by law they have
5.	KYC Process	Inform 1. Tax ID + Birth date 2. Full address
6.	Receive the insurance policy	Policy issue 1. Mail 2. Via PDF e-mail

Process scheme (as-is)
Client <=> Broker <=> Insurer

Data and information (as-is)		
Data	**Type**	**Description**
1	Documents	1. Mobile phone number, IMEI, Model, Manufacturer 2. Tax ID, Birth date, Full Address 3. Credit card number
2	Payment transactions	Via Credit Card; Invoice

Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
1	Lawyers	Insurance regulation
2	Insurers and Assistances	Provide tradition insurance products for destitution and Risk coverage in case of a claim.
3.	Retailers	Phisical Distribution channels to reach the client.

Other Notes
Any assumptions, issues

Section 3: Expected process

Expected Flow (to-be)		
Step	**User Actions**	**System Actions**
0.	Share the Good with others	Member-get-member via social media to earn progressive discounts, until you get your insurance for free
1.	Download 88i app from Google play	Install the app *https://play.google.com/store/apps/details?id=io.insurtech88i*
2.	Login (ID)	Login with Google or Facebook
3.	Get a quote	1. Inform your telephone number 2. Select the coverage value $ 3. Choose the types of coverages 4. Receive a proposal
4.	Purchase your Protection	Select the type of payment 1. Credit Card 2. Invoice 3. Crypto
5.	KYC Process	Inform 3. Tax ID + Birth date 4. Full address
6.	Receive the insurance policy	Policy issue 3. Inside the app insurance wallet 4. Via PDF e-mail
7.	Share the Good with others	Member-get-member via social media to earn progressive discounts, until you get your insurance for free

Process scheme (to-be)

Participants and their roles		
Actor	**Type/Role**	**Description**
1	Documents	4. Social media ID; Name, e-mail, picture 5. Mobile phone number, IMEI, Model, Manufacturer 6. Tax ID, Birth date, Full Address 7. Credit card number
2	Payment transactions	Via Credit Card; Invoice or Crypto payment

Data and information		
Data	**Type**	**Description**
1	Lawyers	Insurance regulation Blockchain regulations
2	Insurers and Assistances	Provide tradition insurance products for destitution and Risk coverage in case of a claim.
3.	Taxi App Digital banks Exchanges	Digital Distribution channels to reach the client.

Security and privacy
1. Depends of the network in use. It may vary between R3 Corda, Hyperledger, Etherium, RSK and NEM (each one of them according to the insurance product. Parametric or not) And type of use.

Main Success Scenario + expected time line
Operate our 3 major taxi app platforms and Reach 1 million clients by Dez./2020

Conditions (pre- or post-)
1.

Performance needs
TBD

Legal considerations
1. We could disrupt the whole industry however playing with the rules we must have the traditional players in the game and make alliances with them, broker and insurers to be legally complaint.
2. Circular 294 SUSEP the electronic insurance sales. We provide the feedback inside the app.

Risks
1. Legal. Insurance is extremely regulated and we have a formal insurance layers to help us with that.
2. Tech, We are creating something with no precedent and good technical resources a hard to find. Accelerate the development of new products already mapped by the business team.
3. Human resources. Need to increase the seniority and professionalize to further investment rounds

Special Requirements
Business and technical requirements of use case

External References and Miscellaneous

Other Notes

Unifying Economies of Goods & Services and of Information

Section 1: Summary

Use Case Summary			
Use Case ID:	FIN-006	**Use Case Type:**	Vertical
Submission Date:	April 1, 2019	**Is Use Case supporting SDGs**	Yes
Use Case Title:	Unifying Economies of Goods & Services and of Information	**Domain:**	Financial
Status of Case	Proof of Concept	**Sub-Domain**	F,K
Contact information of person submitting/ managing the use-case	Bradley Clarke CEO, rsr.dev bradley@rsr.dev +1 714 604 8332 twitter.com/bradleyc https://rsr.dev		
Proposing Organization	Resurgence Dev		
Short Description	We use DLT to formalize economies of goods and services and of information within a single system in the context of a refugee camp, using both social and financial leverage to create new opportunities for targeted delivery of aid and create a scaffold for enduring growth.		
Long description	A major problem of informal economies is that assets within the economy have no way to be exposed to leverage or interest based investments. Tying physical inventories to a virtual currency opens an avenue for goods to also be leveraged. Formalizing a goods & services economy on the blockchain also allows for the pinpoint delivery of aid via community incentives. In other contexts, this would be called "gamification". Tying aid to "interest" on goods stored helps ensure that the amount of aid injected into the economy does not overwhelm organic growth of the economy, serving as scaffold for growth rather than creating a dependence on aid. We propose the formalization of the information economy on a microblogging platform, where participants in the network are able to reward each other for efforts in creation and curation of content. This economy would share the same currency as the layer for goods & services. By adding a social layer, good actors can visibly identify themselves as participants in both the goods & services and the information economies. Gamification can be used to coordinate incentivized behavior. Each transaction can optionally be broadcast on the network for visibility.		

SDG in Focus (when applicable)	1) No Poverty 8) Decent Work & Economic Growth 10) Reduced inequalities		
Value Transfer:	Virtual token to track value of economies of goods & services and of information	**Number of Users:**	50,000 – 100,000
Types of Users:	Residents of a refugee camp		
Stakeholders	Residents of camp Camp administration Governing body that issues / certifies identity		
Data:	The DLT would store and track a digital token for a given camp. It would also store references to actions taken by system actors in the real world and in the social layer. The social application layer would store content outside the DLT with immutable references to the content (via a hash) stored on the DLT.		
Identification:	A public / private keypair will be issued to each resident involved in the study. This is be tied to either a retinal scan or a phone's IMEI number / SIM card, depending on available technology.		
Predicted Outcomes:	Formalizing the goods & services economy through virtual currency allows smoother flows of capital within the cap, ability to measure aid utilization and target future aid, and potentially expose physical assets to interest bearing instruments. Formalizing the information economy exerts social pressure to encourage participation of good actors and counter the influence of bad actors and create tangible rewards for creating / curating useful information. The social layer can also serve as irrefutable proof of reputation if it is needed as residents exit the camp.		

Overview of the Business Problem or Opportunity
Why Distributed Ledger Technology?
DLT allows secure, immutable, and transparent registry of real-world goods tied to virtual currency. It brings the same level of security, immutability, and transparency to the information economy. The currency can also be verifiable if it becomes portable / convertible to any other currencies. Moving every transaction to the DLT creates transparency in the economy at large, removing dark areas in which bad actors prefer to act.

Section 2: Current process

Current Solutions
Currently, the most advanced solution we are aware of uses iris scanning in the distribution of aid resources. (see reliefweb page listed under external resources).

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
1.	Transactions	Transactions must be carried out either with cash or barter. Supply issues can become a severe bottleneck in the economy
2.	Idle state of assets	Any physical inventory can't be exposed to interest
3.	Informal organization of information	Severe difficulty in spreading critical information to those who need it; natural rewards to those who hoard information.
4.	Dampening effect of bad actors	Bad actors can have an outsize effect in the economy through exerting direct monetary power or indirectly by creating social pressure toward

Process scheme (as-is)
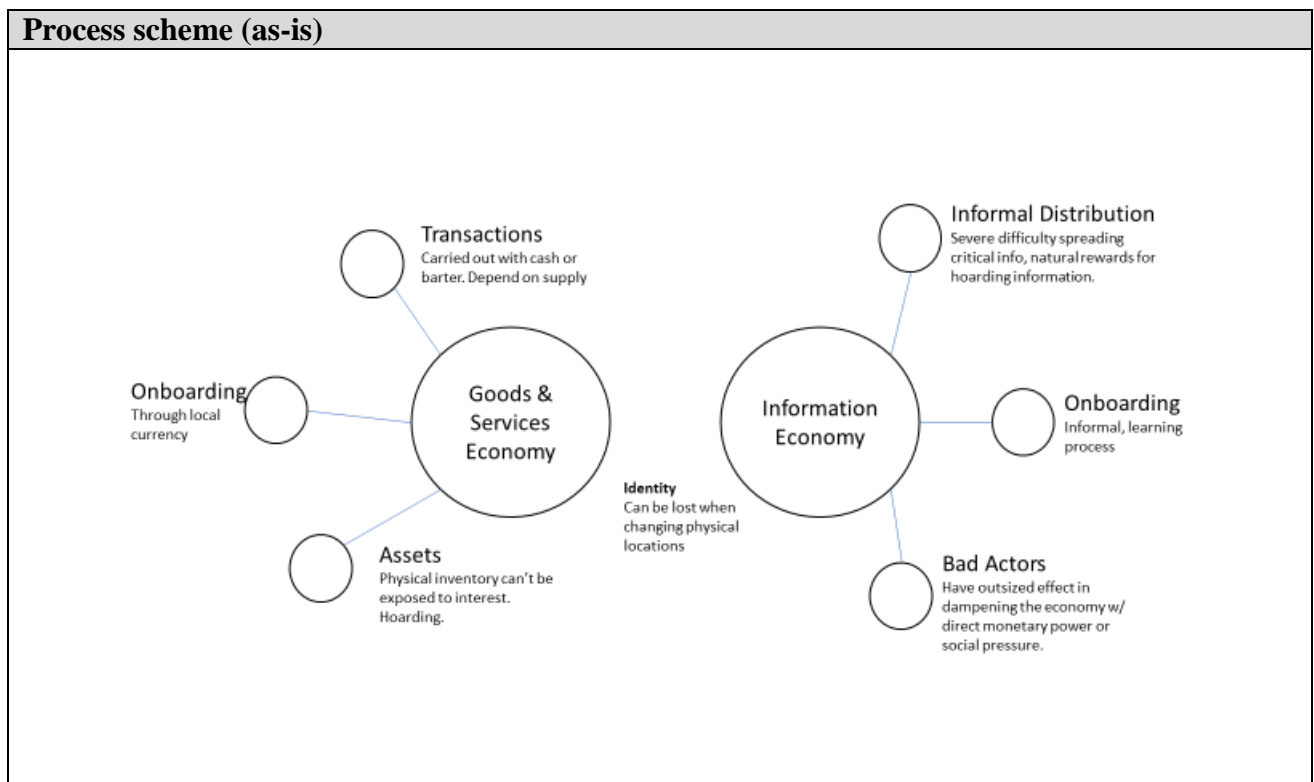
Data and information (as-is)		
Data	**Type**	**Description**
1	Paper money	Fiat currency

Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
1	Vendors	In context – any individual that engages in goods-for-currency trades

Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
2	Consumers	In context – transacts via barter or service exchange, or makes currency-for-goods purchases.

Other Notes
Any assumptions, issues

Section 3: Expected process

Expected Flow (to-be)		
Step	**User Actions**	**System Actions**
1.	Onboarding	Users issued software wallets with a small starting balance.
2.	Inventory	Vendors inventory their goods to be tied to digital tokens.
3.	Transactions	Users can transact using digital currency, either peer to peer or customer to vendor. Tokenized goods get transferred from seller to purchaser
4.	Incentives	As users transact, they can publish their transactions to a micro blogging service. Rewards for system participation can be issued on the basis of transaction quantity, value, or any dimension which could foster adoption.
5.	Publishing	Any user of the social layer can publish a micro blog post.
6.	React / Reward	Any user of the social layer can react to a published post and may choose to send a reward to the user who published the content. This should reinforce positive behavior.
7.	Curation	Users who choose to curate valuable social information in their published posts may be able to accrue substantial value.
8.	Exposure to returns	Digital currency or tokenized assets can be exposed to interest bearing investments / "savings accounts", or interest might be simulated via direct aid payments as a percentage of assets tracked in the system.
9.	Identity foundation	An individual user's activity in the social layer and the goods and services layer can use their account history while establishing documented identity in a future host country.

Process scheme (to-be)

Inventory
Vendors inventory goods to
digital token

React / Reward
Users can react / send rewards to
users who publish valuable content

Onboarding
Users issued software
wallet w/ initial balance

Transactions
Users exchange
digital currency for
goods p2p and
vendors

Incentives
Rewards for
participation in
transaction information
sharing

Goods & Services
Economy

Exposure to Returns
Assets tracked by digital
currency can be exposed
to interest / value accrual

Identity Foundation
Social and Economic layer
combine to form a richer
identity model based on
account history

Information
Economy

Publishing
Micro blog posts

Curation
Users can be rewarded for
organizing valuable content

Transaction Flow

User A stakes to post message

User B interacts with the message,
sending a tip to User A

User C gets useful information from
User A's post, and sends a moderate
donation to User A

After receiving positive interactions,
User A's initial stake is returned

After several high performing posts,
User A buys bread from User B,
transacting in Ethique.

Participants and their roles

Actor	Type/Role	Description
1	End Users	Participate in both the goods / services layer of the economy and the social layer
2	Program Administrators	Workers who help educate about and facilitate the program.

Data and information		
Data	**Type**	**Description**
1	Wallets	A software that stores basic identity information about the bearer of the wallet and keypairs that hold the assets in the system.
2	Tokenized Assets	Durable goods can be tracked by virtual non-fungible tokens and potentially used as collateral for financial services
3	Microblog posts	User submitted posts related to transactions or created entirely by users.
4	Virtual Currency	Both goods / services layer and social layer are tied to the same virtual currency.

Security and privacy
1. Privacy is a major concern. We recommend that security / stability data science driven monitoring of the system be performed anonymously, and that network topology approaches be preferred in locating bad actors over watching the transactions of targeted users. 2. It will be critical to establish that devices used to access wallet services have some level of security, such as passcode enabled.

Main Success Scenario + expected time line
Success will be met when the vast majority (80%) of camp transactions take place via online currency. Timeline: 4 weeks – requirements gathering, interviews, on-site inspection 12 weeks – software implementation 4 weeks – on site deployment, on site instruction, begin inventory 12 weeks – rollout of system across camp 12 weeks – monitored / incentivized adoption

Conditions (pre- or post-)
Requires internet or SMS access for end users.

Performance needs
Needs to be on a DLT that can handle high throughput. A RAFT-like consensus algorithm would suffice. End users would need devices capable of connecting to either an SMS or Web-based interface.

Legal considerations
For each issue, please describe the name of the legal act containing the identified barrier, what is the negative impact and a proposal to overcome this negative impact.   *1.*

Risks
Legal issues that have not yet been defined will likely emerge from this process.   Bad actors frequently resist attempts at economic formalization and could stall adoption.

Special Requirements
N/A

External References and Miscellaneous
https://ethique.link   https://reliefweb.int/sites/reliefweb.int/files/resources/68256.pdf   https://www.technologyreview.com/s/608764/how-blockchain-is-kickstarting-the-financial-lives-of-refugees/   https://www.un.org/sg/en/content/sg/personnel-appointments/2018-11-29/task-force-digital-financing-sustainable-development

Other Notes
Any assumptions, issues

Appendix 1:
Domains and subdomains for use cases categorization

Vertical:

1. Finance
   a. Financial management & accounting
   b. International & interbank payments
   c. Clearing and settlement
   d. Reduction of Fraud
   e. Financial messaging
   f. Asset lifecycles and history
   g. Trade finance
   h. Regulatory compliance & audit
   i. AML/KYC
   j. Insurance
   k. Peer-to-peer transactions
2. Healthcare
   a. Pharma
   b. Biotechnology
   c. Medicine
3. Industries
   a. Manufacturing
   b. Energy
   c. Chemical
   d. Retail
   e. Real estate
   f. IT and telco
   g. Supply chain management
   h. Transportation
   i. Agriculture
4. Government and public sector
   a. Taxes
   b. Government and non-profit transparency
   c. Legislation, compliance & regulatory oversight
   d. Voting
   e. Taxation and customs
   f. Intellectual property management
   g. Land Registries

Horizontal:

1. Identity management
2. Security management
   a. Public Key Infrastructure
3. Internet of Things

4. Data processing, storage and management
    a. Data Validation (includes provenance)

———————————————

Moeda's Global Ecosystem for Financial Inclusion and Sustainable Development Growth

Section 1: Summary

Use Case Summary			
Use Case ID:	FIN-007	**Use Case Type:**	*Horizontal*
Submission Date:	March 3, 2019	**Is Use Case supporting SDGs**	*Yes*
Use Case Title:	Moeda's Global Ecosystem for Financial Inclusion and Sustainable Development Growth	**Domain:**	Cross-domains: Finance, Industries, Government and Public Sector, Identity Management, Security Management, Data Processing, Storage and Management
Status of Case	*Operating*	**Sub-Domain**	*Finance (Financial management & Accounting, International and Interbank Payments, Clearing and Settlement, Reduction of Fraud, Asset Lifecycles and History, Trade Finance, Regulatory and Compliance, AML/KYC, peer-to-peer transactions) Industries (Manufacturing, Supply chain Management, Agriculture) Government and public sector (Government and non-profit transparency, legislation, compliance and regulatory) Identity Management, Security Management, Data Processing Storage and Management*
Contact information of person submitting/ managing the use-case	*Taynaah Reis* *taynaah@moeda.in* *@taynaahreis*	*President and CEO* *+1 347 8229423* ***www.moedaseeds.com***	
Proposing Organization	**Moeda Semente Brasil – Desenvolvimento de Software e Serviços Financeiros S/A** CNPJ 30.669.919/0001-33		
Short Description	*Moeda is an ecosystem of companies (Fintech, Accelerator, Crypto Exchange, Marketplace and BLOC Impact Fund Ventures) that uses blockchain technology to revolutionize finance by connecting mission-driven investors with community-owned enterprises and providing the means for alternative financing, knowledge, resource exchange, and collective action.*		

Long description	Moeda's ecosystem of companies (Fintech, Accelerator, Crypto Exchange, Marketplace and BLOC Impact Fund Ventures) is effectively leapfrogging some of the most common challenges such as: lack of transparency, a preponderance of middlemen, and inefficiency. The system's architecture design through Blockchain allows the creation of trustworthy, immutable records, as well as cost-saving tackling social problems through innovative and scalable solutions in a secure way around the globe to achieve sustainable development. Moeda's ecosystem removes three key barriers that have plagued effective public financing of the Sustainable Development Goals (SDGs) . Insufficient Transparency Impact lenders have little visibility into sustainable investments. This makes it risky to manage a large portfolio because there's no way to see where the money is going. . Insufficient Access to Capital Due to the lack of transparency, borrowers have limited options for investment. Moeda gives borrowers a way to establish reputation, document project status, and to collaborate with others in the community. . Investment Bias Statistics have shown that investors have a gender bias against women-led projects, despite having historically higher success ratios and repayment rates than projects run by men. Brazil has the largest gap, whereby 45 percent of women-owned SMEs identify access to finance as a major constraint in operating and growing their businesses. In August 2017, Moeda raised US$ 20 million in an Initial Coin Offering (ICO) and its proprietary digital token, the MDA, has been listed on several exchanges including Binance, one of the largest in the world. Until today, Moeda has deployed over R$ 4.7 million in impact investments that supports 7.500 direct beneficiaries. In March 2019, Moeda has created BLOC, alongside Bamboo Capital Partners ("Bamboo"), an impact investing platform, the Government of Togo and Smart Africa, a bold and innovative commitment from African Heads of State and Government to accelerate sustainable socioeconomic development on the continent, ushering Africa into a knowledge economy through affordable access to Broadband and usage of Information and Communications Technologies. The Smart Africa Alliance has since grown to include BLOC is the first impact fund in the world which uses blended finance to exclusively invest in companies that use new technologies, in particular blockchain, to benefit the low- and middle income populations in emerging markets. It demonstrates the joined ambition from public and private investors to tackle social and environmental challenges, leveraging innovative business models

	leapfrogging emerging markets and poverty. The Fund allocation of €100 million from a combination of public and private sector investors will focus on five key sectors: energy, education, financial inclusion and healthcare. Bamboo Capital is asset manager of BLOC Fund ventures in Luxembourg and Moeda's technology expertise provides investors on Bloc Fund Ventures full traceability of their investments. It is innovative because accepts investment in both hard currencies (EUR, USD) and cryptocurrencies (MDA, MDAB), using a KYC platform to convert the latter into either EUR or USD..
SDG in Focus (when applicable)	*Our initial focus are 6 of the Sustainable Development Goals – 1. No Poverty, 2. Zero Hunger 5. Gender Equality, 13. Climate Action 10. Reducing Inequalities and 17. Partnerships for the Goals.*

Value Transfer:	*Assets, Tokens (cryptocurrency public traded MDA, stable/reserves coins MDABRL, MDAUSD, MDAEURO, debenture coin MDADIB, loyalty/rewards coins MDAB, MDALOYAL, MDAX)*	Number of Users:	*100.000+*
Types of Users:	*Borrowers (Individuals, Entrepreneurs, SME's, Cooperatives) Investors (Individuals, Private Institutions and Impact Funds, Financial Institutions Agencies, Government and Public Sector), International Development Organizations and Research Academic Institutions*		
Stakeholders	*Borrowers (Individuals, Entrepreneurs, SME's, Cooperatives) Investors (Individuals, Private Institutions and Impact Funds, Financial Institutions Agencies, Government and Public Sector)*		
Data:	*Types of Data: Attributes to ID and Authentication, Payment Transactions (Wallet Account, Balance, Transfer, Exchange, Swype, Split) Documentation (Projects Accountability, Supply chain, Wiki)* *Moeda Impact Ecosystem Platforms Hybrid Architecture Infrastructure* *The Moeda Impact Ecosystem Platforms are a combination of software programs built on four blockchain protocols, i.e. Hyperledger, Stellar network, Ethereum and the Binance Chain protocol and Moeda's API legacy systems.* *Moeda has built a partnership with IBM and DACS (Digital Asset Custody Services) and leverages IBM's LinuxOne servers and Crypto Express6S HSMs to provide the strongest possible security environment. Crypto Express6S is the highest commercially rated HSM in the world (FIPS 140-2 Level 4). Private keys are always encrypted and cannot be extracted or imported.* *All on-chain data related to Moeda's Platforms token transactions are kept private, such as documentation related to identity and authentication, confidential contracts and other agreements with sensitive information are managed through Hyperledger Fabric. Users retain sole custody of their*		

private keys throughout the transaction process, this gives full control to investors over their own funds without having to rely on an exchange.

Stellar network performs as a gateway for Fiat-Crypto transactions on Moeda's platforms. Stellar network allows easy and fast conversions of almost any fiat currencies into MDA-Fiat cryptocurrencies. Also it supports smart contracts which will ensure the whole Moeda's platforms to run smoothly.

On the other hand, in order to bring more scalability, decentralization and security to the software and more liquidity to token holders, Crypto-Crypto transactions on Moeda's platforms happen on Binance chain.

At Moeda's platforms, interchain swap tools and protocols were developed in conjunction with other transaction performance-enhancing tools both on Binance chain and Stellar network.

Moeda cryptocurrencies (stable/reserves coins MDABRL, MDAUSD, MDAEURO, debenture coin MDADIB, loyalty/rewards coins MDAB, MDALOYAL, MDAX) are deployed on both Stellar network and Binance chain. The tokens on Stellar network function as the actual utility tokens, while those on Binance chain can be exchanged with other cryptocurrencies. The token ownerships on both Stellar network and Binance chain are synchronized on a real-time basis thanks to interchain swap technologies.

Moeda's BLOC Impact Fund Ventures Investment Platform

The Moeda's BLOC platform aims to provide high quality and standardized impact fund service where investors have the opportunity to invest in top impact funds, not only to obtain considerable returns, but also to create global social benefits. The platform is joining forces with a number of well-known fund institutions to launch multiple funds, including Bamboo Capital, UNDP, etc.

Moeda's BLOC Platform aggregates liquidity across token exchanges by treating the entire landscape as a potential reserve. Bloc reserves provide a supply and demand of various tokens that are readily available to be executed based on the reserve's quoted buy and sell prices for that token. These reserves are created by on-chain smart contracts (Moeda's Chain) that enforce the trade execution and settlement process. The trade price is also programmatically determined by a smart contract. The reserve model enables Bloc users to enter trades more easily given that the supply and demand sides have fixed terms and are readily available to trade upon those terms. This removes the potential friction involved in discovering counterparties and negotiating.

Automated order filling

With an automated order filling Bloc Reserve Managers feed dynamic exchange rates into the Moeda's smart contract and orders are filled at the current exchange rate, an algorithm will match orders automatically. Automated order

	filling reduces the amount of user time and effort needed to identify suitable trades, thereby reducing order filling latency.
	Moeda's BLOC Transaction Settlement
	On-chain settlement helps users publicly verify on the ledger that their trades were settled according to their desired terms.
	Moeda's BLOC Consensus
	Bloc has a flexible governance model MDAB-weighted delegated voting system where voting power is directly proportional to the amount of MDAB you have. Validator will be able to choose to stake its own token into the smart contract. Any holder of the MDAB token will have the option of proxying the held MDAB token to some Validator Node for Staking.
	Moeda's API (Legacy Systems)
	MOEDA API
	The MOEDA API is hosted on Microsoft Azure and deployed using Docker containers, which give us increased confidence that our development, staging, and production environments are consistent.
	MOEDA API microservices architecture consists of a collection of autonomous services: Authentication, Wallet, Exchange and Projects. Each service module is self-contained and implements a single business capability. Microservices are a popular architectural style for building applications that are resilient, highly scalable, independently deployable, and able to evolve quickly.
	The services are deployed independently. A team can update an existing service without rebuilding and redeploying the entire application.
	The Services are responsible for persisting their own data or external state. This differs from the traditional model, where a separate data layer handles data persistence.
	The Services communicate with each other by using well-defined APIs. Internal implementation details of each service are hidden from other services.
	MOEDA's API Languages and Tools
	The MOEDA API and Frontend are both built using JavaScript. We use next-generation JavaScript through Babel to take advantage of improved language features such as async/await and modules. All tests are built using Jest. The frontend integrates with the API using Apollo's GraphQL Client. The application data is stored within a PostgreSQL database, also hosted by Azure.
Identification:	*Moeda's Identity Blockchain and Legacy Systems Inter-operability*

	Authentication API
	In the Authorization API all the information is secures by a token present in each requisition. All the requisitions are logged and the given token is discarded after used. A new one is generated after each requisition.
	A hash is designed to act as a one-way function: A mathematical operation that turns readable data into a scrambled cipher and cannot be reversed. In cryptography, a salt is random data that is used as an additional input to a one-way function that "hashes" the password.
	The user's login password is not saved. Instead, in the database is saved the resulting mathematical operation of the password mixed with the salt, guarantying the user's privacy.
	When a new account is created, an configurable e-mail and a SMS is sent with a random unique code to confirm the user ownership and block robots.
	The user's account balances are not stored in a local database, they are retrieved live from the blockchain real network.
	Moeda's Wallet API
	In Moeda's Wallet, the private key is automatically generated whenever a new user is created. This key is then encrypted using script algorithm and each information needed to decrypt this private is stored in separated servers. The raw private key is not stored anywhere.
	The address, as said, is generated from the public key and the public key is generated from the private key, so, indirectly, the address is generated from the private key. As the own name suggest, the public key can be publicly distributed, as it is possible to recover the private key with this information.
Predicted Outcomes:	*For Investors (Individuals, Private Institutions and Impact Funds, Financial Institutions Agencies, Government and Public Sector):* • *Access to SDG-aligned investment portfolio opportunities* • *Greater transparency into SDG-aligned Impact Investments* • *Trust of cryptographically assured blockchain records and contracts* • *Increased auditability* • *Decreased Risk* *For Borrowers (Individuals, Entrepreneurs, SMEs, Cooperatives)* • *Provide a multi-purpose digital identity and opportunities to build credit-worthiness and reputation* • *Access to affordable capital* • *Facilitate to efficiently scale community investments* • *Facilitate payment transactions* • *Business education*

	• *Enhance access to other financial services*
	• *Access to online marketplace*

Overview of the Business Problem or Opportunity

According to the World Bank, approximately 2 billion people of the world are not included on the financial system, don't have access to a banking account, or worse, they have negative credit and are in debt.

In regards to the under banking of women, a recent Goldman Sachs research report states that the global credit gap for women is estimated at $300B. Closing that gap could increase per capita income in emerging markets by an average of 12 percent by 2030, and could be as large as 25-28 percent for Brazil.

This moves us into impact investing where investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return. In this way, we can align the interest of sustainability with that of investing – financial returns.

Moeda's Ecosystem removes three key barriers that have plagued effective public financing of the Sustainable Development Goals (SDGs):

Insufficient Transparency
Impact lenders have little visibility into sustainable investments. This makes it risky to manage a large portfolio because there's no way to see where the money is going.

Insufficient Access to Capital
Due to the lack of transparency, borrowers have limited options for investment. Moeda gives borrowers a way to establish reputation, document project status, and to collaborate with others in the community.

Investment Bias
Statistics have shown that investors have a gender bias against women-led projects, despite having historically higher success ratios and repayment rates than projects run by men. Brazil has the largest gap, whereby 45 percent of women-owned SMEs identify access to finance as a major constraint in operating and growing their businesses.

Why Distributed Ledger Technology?

Distributed Ledger Technology is a powerful tool that is already shaping the future of the Internet with simple, safe and secure transactions, bringing a new wave of Economic Opportunity and Digital Innovation.
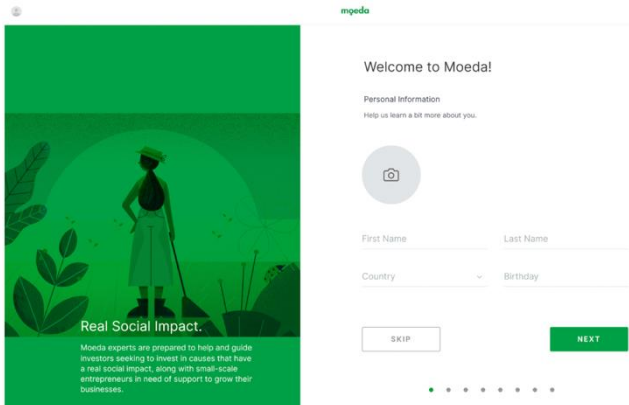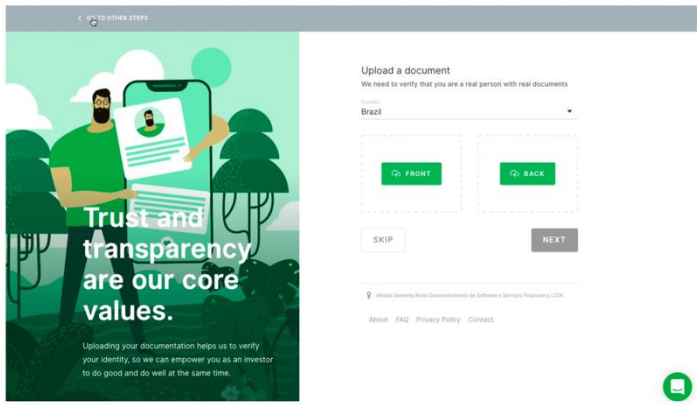
The blockchain technology facilitates the exchange of value without the need for intermediaries, enables transparent interactions of parties through a trusted and secure network that distributes certified and auditable access to data, simplifying the existing processes lowering the costs and increasing the capital efficiency.
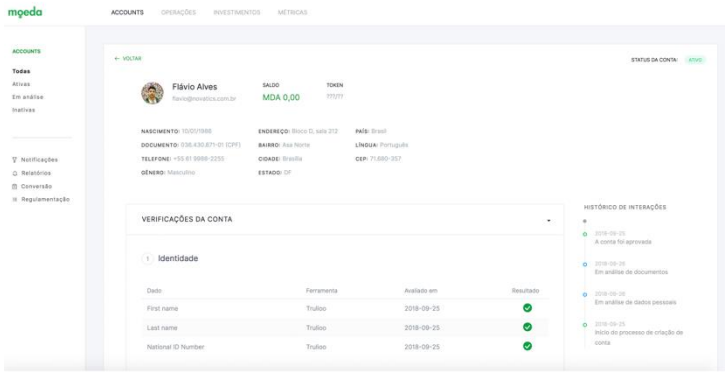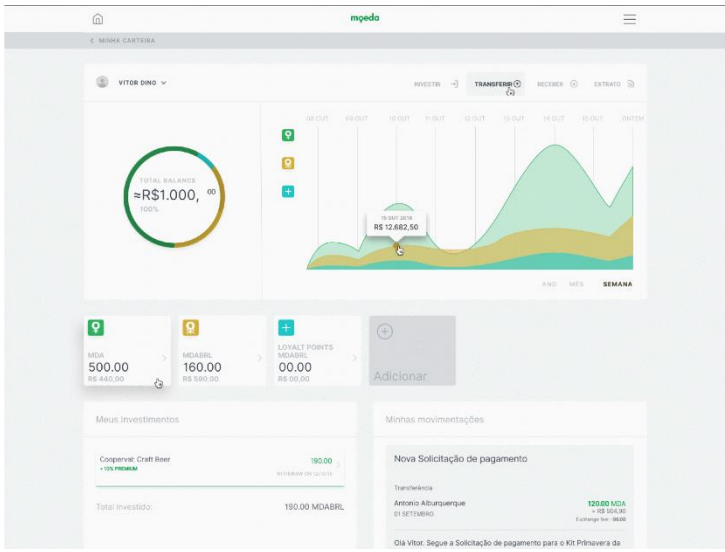
Section 2: Current process
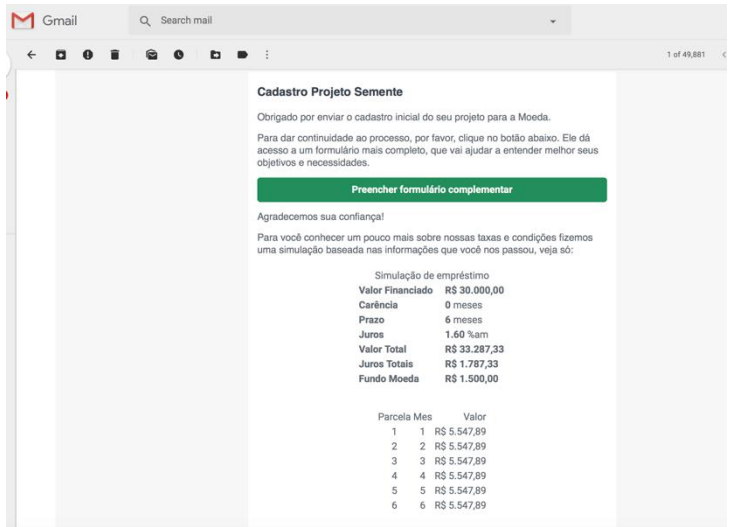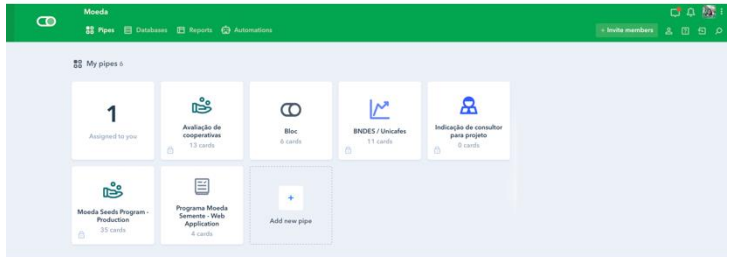
Current Solutions
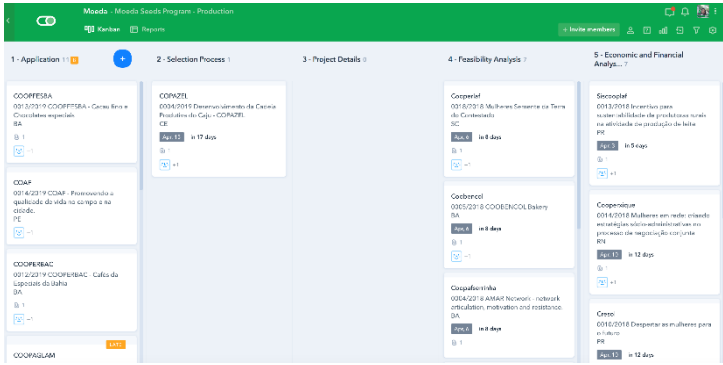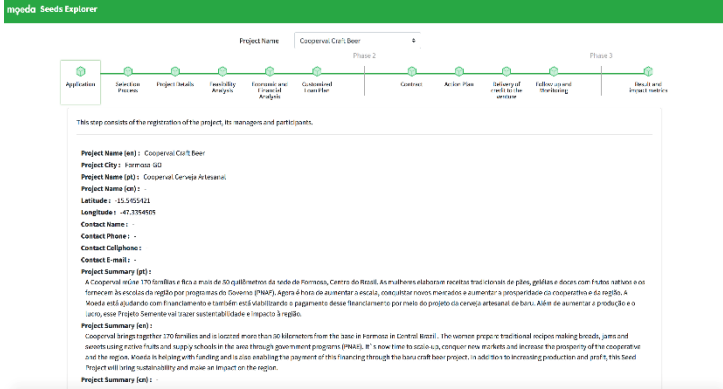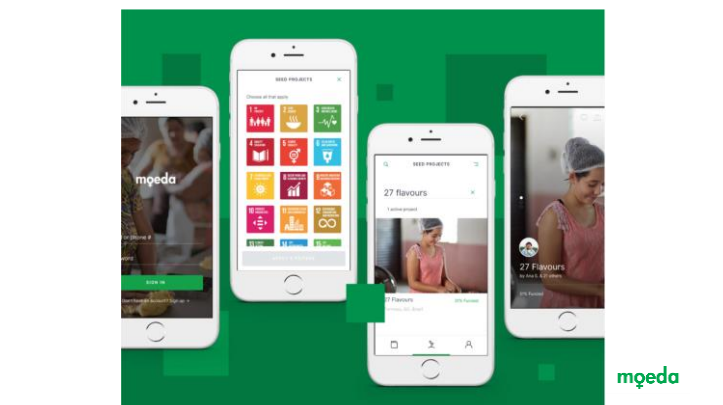
Moeda's Ecosystem utilizes DLT based trust of cryptographically assured blockchain records and contracts to provide the following solutions:
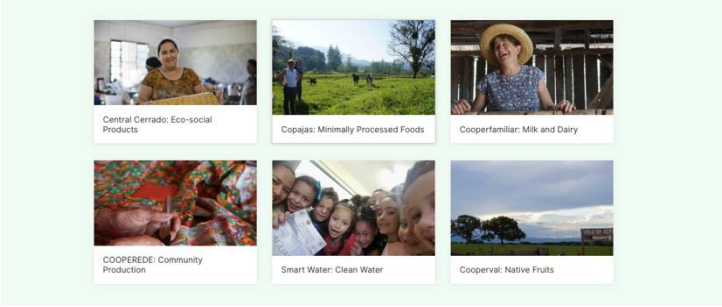
- *Access to SDG-aligned investment portfolio opportunities*

- *Greater transparency into SDG-aligned Impact Investments*

- *Increased auditability*

- *Decreased Risk*

- *Provide a multi-purpose digital identity and opportunities to build credit-worthiness and reputation*

- *Access to affordable capital*

- *Facilitate to efficiently scale community investments*

- *Facilitate payment transactions*

- *Access to online marketplace*

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
1.	<u>*Account Sign Up*</u> *User is required to submit personal information (name, age, country..) ID images, proof of address, acknowledge terms of use) to have access to a Moeda ID and Account*	
2.	<u>*ID Authentication (Global KYC/AML)*</u> *User is required to submit personal information ID images, proof of address, acknowledge terms of use to have access to a Moeda Wallet and access to Investments)*	
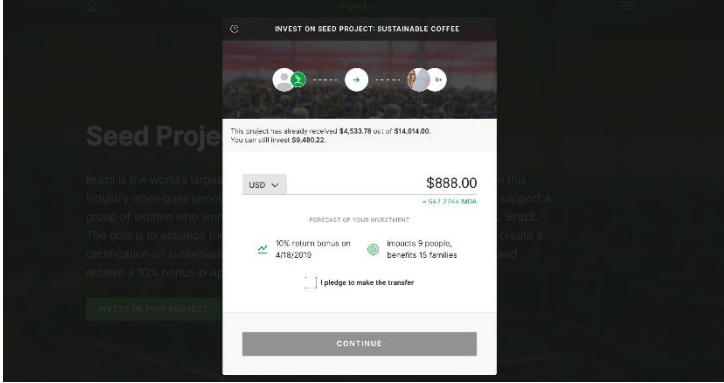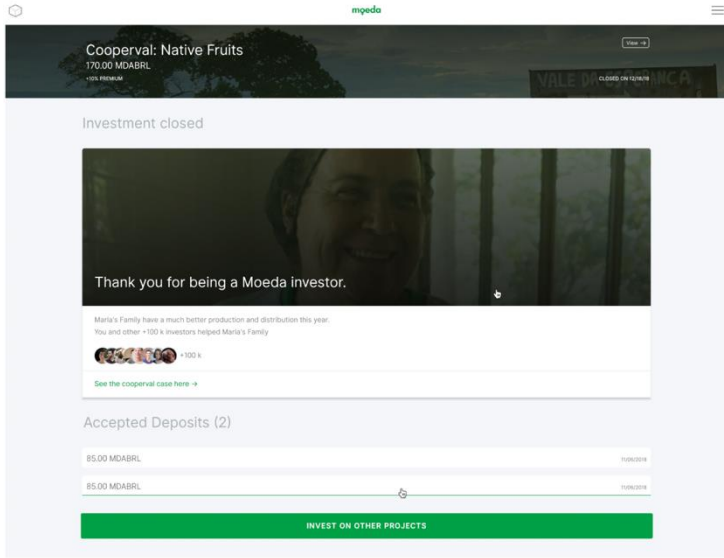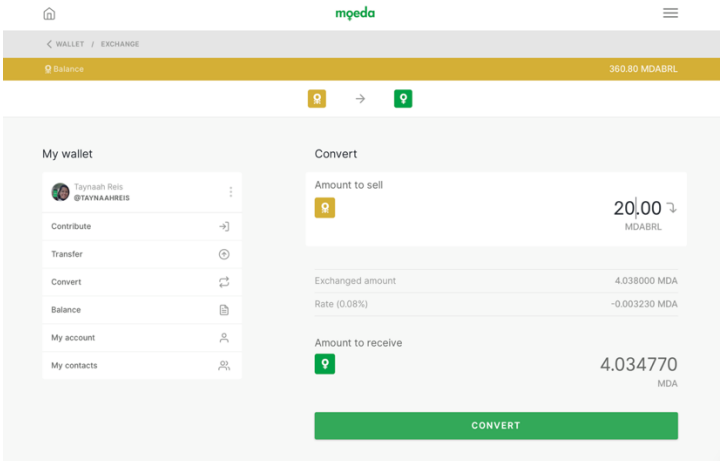
Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
2.	*<u>Backoffice Analysis of Accounts for KYC and AML with Global coverage</u>* *Account Analysis uses both automatic machine learning process (Trulioo Global API and IDWall Brazil) and Manual process through Moeda's compliance team approval.* *Account approval takes from 3min to 3 days.*	
2.	*Moeda's Wallet* *Upon user's KYC/AML account approval, user is allowed to access it's Moeda's Wallet (Balance overview, investments portfolio, p2p payments Transfer, currency exchange)*	
	Moeda Seeds Accelerator Program Project/Loan Submission *To enter the Moeda Seeds Accelerator Program, Individuals/entrepreneurs are encourage to fill an application to submit it's Project/Loan*	
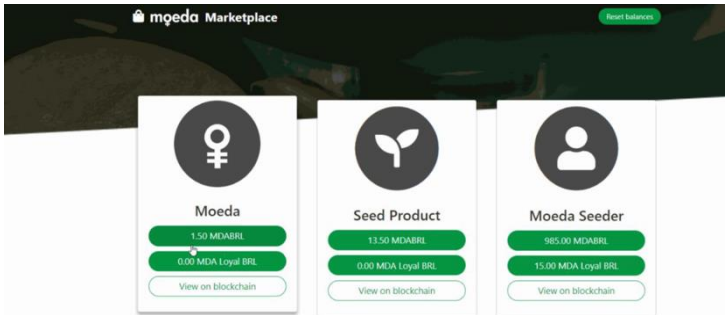
Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
	Moeda Seeds Accelerator Program Project/Loan Submission *The application allows Moeda's compliance team to curate projects in alignment with the programs objectives.*	
	Moeda Seeds Accelerator Program Project/Loan Response *Upon completing the application the Individuals/entrepreneurs receive within 3 min an automatic analysis and estimate simulation of the loan and is encourage to provide more details to work on a customized loan plan.*	
	Moeda's Project Tracking Dashboard *Moeda Seeds Accelerator Program team and its partners are equipped with a unique system that allows to track each stage of a enterprise/individual loan/project submission (from application selection process, feasibility and economic analysis, payments, results and impact)*	

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
	Moeda's Project Tracking Dashboard *Moeda Seeds Accelerator Program team and it's partners are equipped with a unique system that allows to track each stage of a enterprise/individual loan/project submission (from application selection process, feasibility and economic analysis, payments, results and impact)*	
	Moeda's Project Explore using Hyperledger Fabric *Moeda's share public information related to the project tracking system on it's website*	
	Moeda Seeds Accelerator Program Explore using Hyperledger Fabric *Moeda's share public information related to the projects tracking system on it's websites*	
	Moeda's APP *Users are allowed to access the platform to an Android App available on Google Play Store*	

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
	Moeda's Investment Portfolio *Upon selection on the Moeda Seeds Program Accelerator, projects are showcased on the website (www.moedaseeds.com.br/projects) and can be open for co-investment and it's progress can be monitor online*	

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
	Moeda's Investment Portfolio Project Details *Upon selection on the Moeda Seeds Program Accelerator, projects are showcased on the website and can be open for co-investment and it's progress can be monitor online*	

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
	Moeda's Investment Portfolio *Projects accept the following cryptocurrencies: MDA, MDABRL, MDALOYAL, BNB and MDAX*	
	Moeda's Development Impact Bond *Co-Investors at the Moeda Seeds Program Accelerator Portfolio of Projects receive a Moeda's Development Impact Bond (MDADIB) to track it's investments on the dashboard.*	
	Moeda's Wallet *User is allowed to exchange cryptocurrencies within the ecosystem*	

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
	Moeda's Marketplace *With pioneering and singularity initiative in construction an e-commerce platform with built-in cross-blockchain-based technology, especially related to an ecosystem of positive impact and sustainable generation, Moeda Market Place establishes the last mile of sales' and distribution of an entire chain of production, selection and development of social products, confirming its commitment with the circular and creative economy, corroborating its capacity to generate social impact and positive transformation.*	
	Moeda's Marketplace *Performing split transparent payments. Initially, through MDABRL, the use of the Stellar protocol allows the tracking of financial resources. It grants transparency in the ability of the user to verify how much is coming to the producer in relation to that purchase, and the amount that remains for the operation for Moeda Seeds.* *In addition, for each MDABRL transaction held in Moeda Market Place, Stellar protocol establishes a direct relationship with the Moeda Loyalty Program, which instantly generates MDALOYAL (XLM) points for users. Outside the incentive system, in case of purchasing products using PayPal, for*	

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
	example, the user does not receive points.	
	With Moeda ecosystem integrated user login and also direct integration with the Moeda Stellar Wallet already registered by the user, it is possible to use his own current balance to buy products at Market Place.	
	All transactions performed at Moeda Market Place are registered in the Stellar public network, and its information can be observed in real time.	

Process scheme (as-is)

Moeda's Ecosystem flow of Assets and Services
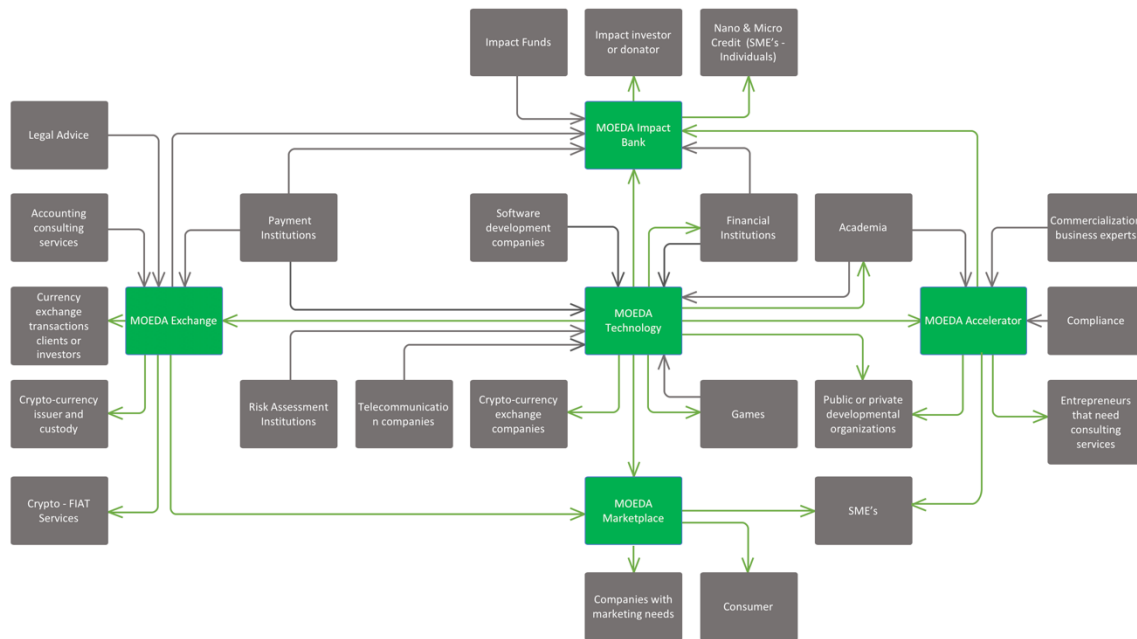
Moeda's Ecosystem Hybrid Architecture (Developed by the main system's Architect Taynaah Reis)

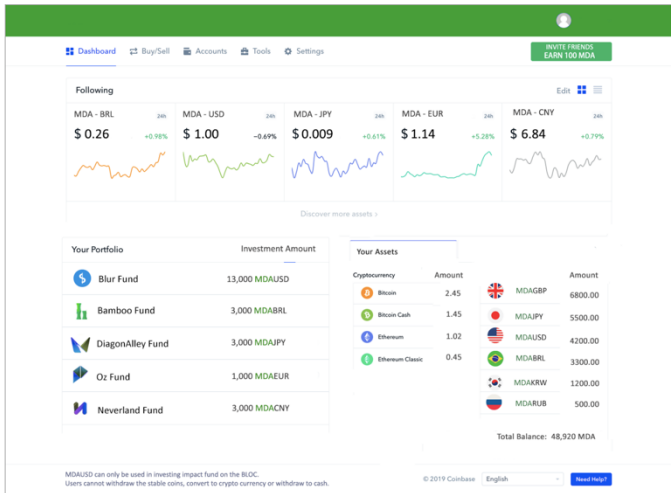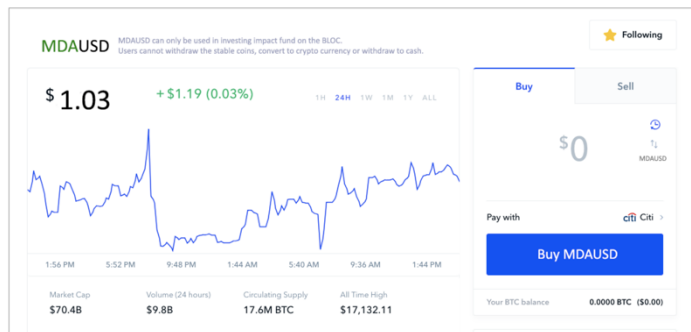| Data and information (as-is)		
Data	**Type**	**Description**
1	***Attributes to ID and Authentication***	*All on-chain data related to Moeda's Platforms token transactions are kept private, such as documentation related to identity and authentication, confidential contracts and other agreements with sensitive information are managed through Hyperledger Fabric. Users retain sole custody of their private keys throughout the transaction process, this gives full control to investors over their own funds without having to rely on an exchange.*

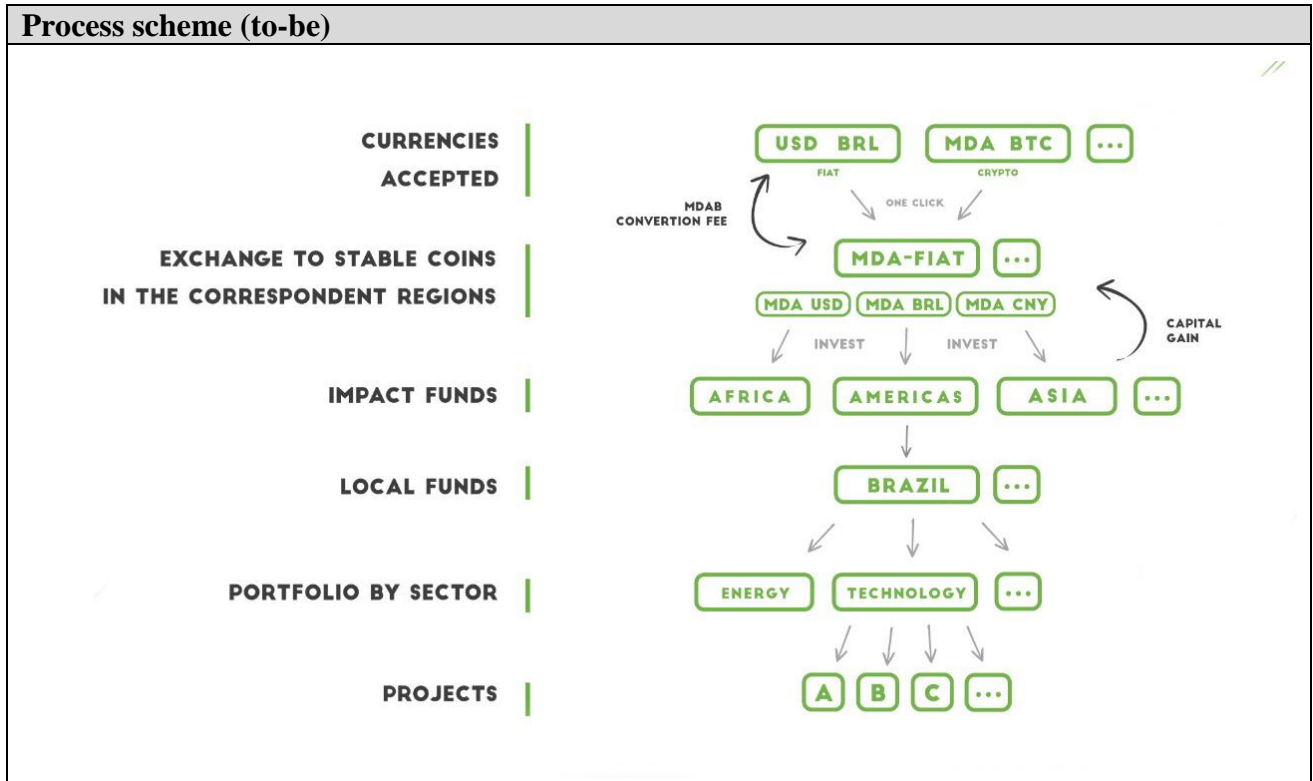| 2	*Payment Transactions (Wallet Account, Balance, Transfer, Exchange, Swap, Split)*	*Stellar network performs as a gateway for Fiat-Crypto transactions on Moeda's platforms. Stellar network allows easy and fast conversions of almost any fiat currencies into MDA-Fiat cryptocurrencies. Also it supports smart contracts which will ensure the whole Moeda's platforms to run smoothly.*
		On the other hand, in order to bring more scalability, decentralization and security to the software and more liquidity to token holders, Crypto-Crypto transactions on Moeda's platforms happen on Binance chain.
		At Moeda's platforms, interchain swap tools and protocols were developed in conjunction with other transaction performance-enhancing tools both on Binance chain and Stellar network.
		Moeda cryptocurrencies (stable/reserves coins MDABRL, MDAUSD, MDAEURO, debenture coin MDADIB, loyalty/rewards coins MDAB, MDALOYAL, MDAX) are deployed on both Stellar network and Binance chain. The tokens on Stellar network function as the actual utility tokens, while those on Binance chain can be exchanged with other cryptocurrencies. The token ownerships on both Stellar network and Binance chain are synchronized on a real-time basis thanks to interchain swap technologies.
		Moeda's BLOC Platform aggregates liquidity across token exchanges by treating the entire landscape as a potential reserve. Bloc reserves provide a supply and demand of various tokens that are readily available to be executed based on the reserve's quoted buy and sell prices for that token. These reserves are created by on-chain smart contracts (Moeda's Chain) that enforce the trade execution and settlement process. The trade price is also programmatically determined by a smart contract. The reserve model enables Bloc users to enter trades more easily given that the supply and demand sides have fixed terms and are readily available to trade upon those terms. This removes the potential friction involved in discovering counterparties and negotiating.
		Automated order filling
		With an automated order filling Bloc Reserve Managers feed dynamic exchange rates into the Moeda's smart contract and orders are filled at the current exchange rate, an algorithm will match orders automatically. Automated order filling reduces the amount of user time and effort needed to identify suitable trades, thereby reducing order filling latency.
		Moeda's BLOC Transaction Settlement

Data and information (as-is)		
Data	**Type**	**Description**
		On-chain settlement helps users publicly verify on the ledger that their trades were settled according to their desired terms.
		Moeda's BLOC Consensus
		Bloc has a flexible governance model MDAB-weighted delegated voting system where voting power is directly proportional to the amount of MDAB you have. Validator will be able to choose to stake its own token into the smart contract. Any holder of the MDAB token will have the option of proxying the held MDAB token to some Validator Node for Staking.
3	*Documentation (Projects Accountability, Supply chain, Wiki)*	*Moeda's Hyperledger Fabric Application*
		By establishing a changeless record database on all financial transactions, Hyperledger's use in Moeda's Ecosystem goes beyond its financial aspect. As well as in the Projects Approval Flow of Moeda Seed Projects, in Market Place Hyperledger keeps track of all steps of approval of the product until its entrance to commercialization. In this way, al the steps that classify products to be socially responsible for their availability become transparente and unalterable. Hyperledger Fabric's modular capability gives Moeda a chance to separate products from Moeda Seed projects or outside.
		Another fundamental aspect of Hyperledger is related to traceability the application in the productive process of the respective commercialized products. Initially applied and available for only a few specific products within Market Place, the full history of the product, its certificates of origin, quality and working conditions will be recorded and displayed. These products will receive a traceability and uniqueness ID, granting the new Moeda certification for socially responsible products in the New Economy Blockchain Market and beyond. In medium term, with optimized processes of selection and evaluation, also counting on the modular aspect of the used protocol, it will be possible to apply this certification not only for entry into the Market Place, but also for other similar environments.
		As a database of immutable records and with calibrated business rules, Hyperledger also prints transparency in the ability to see split payments also made via PayPal.
		With a separate node in the Currency network, but permeating its entire environment, Hyperledger Fabric connects and integrates with the Backoffice both the Moeda administrative portal and the Backoffice of the respective Projects (Producer

Data and information (as-is)		
Data	**Type**	**Description**
		Portal) to follow up on its movements, deliveries and product approvals, among many others.

Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
1	*Borrowers*	*Individuals, Entrepreneurs, SME's, Cooperatives*
2	*Investors*	*Individuals, Private Institutions and Impact Funds, Financial Institutions Agencies, Government and Public Sector*
2	*Research and Academia*	*International Development Organizations and Academic Institutions*

Section 3: Expected process

Expected Flow (to-be)		
Step	**User Actions**	**System Actions**
1.	*Users will be allowed to invest in other Impact Investment Funds and Global portfolios with both FIAT and Cryptocurrencies.*	
2.	*Moeda will provide other services like insurance and currency-hedge*	

Process scheme (to-be)

Security and privacy

Transaction history, digital bank account information, and customer credit card credentials, investment preferences are a few examples of data that needs to be secured from unauthorized access. Unauthorized exposure is often prevented using data encryption and that's is the reason why we have been using blockchain Hyperledger, Stellar, Ethereum and Binance protocols through our systems to significantly increasing data availability and integrity, reducing paperwork handling, storage and loss, and other process improvements related.

Blockchain allows for the creation of trustworthy, immutable records, as well as cost-saving operational efficiencies that then lower the cost of lending while increasing safety.

Offering financial services also require specific approach with backup systems, to guarantee our systems will continue running in case of an incident. Backup schedules and tools are outlined in relevant policies and regularly reported on by functional managers. Awareness training includes how to establish whether backups have effectively been made of organizational data and how to securely store backups on the systems provided.

Moeda has built a partnership with IBM and DACS (Digital Asset Custody Services) and leverages IBM's LinuxOne servers and Crypto Express6S HSMs to provide the strongest possible security environment. Crypto Express6S is the highest commercially rated HSM in the world (FIPS 140-2 Level 4). Private keys are always encrypted and cannot be extracted or imported.

Main Success Scenario + expected time line

*We aim to **significantly improve** Impact Results, by funneling sustainable development investments into local communities across the globe.*

We started in Brazil with and plan to expand the ecosystem to LATAM and Africa in 2019 to reach ***1 million associates by 2020 and 10 million by 2022***.

Performance needs

Moeda's ecosystem platforms have achieved:

- *Low cost of transaction (~0)*

- *Transaction cost <$0.00001*

- *Funds cleared 3-5 seconds*

- *transactions per second 1.000+*

- *Energy per transaction 0.03Wh*

- *Scale capacity to analyse and approve 200 projects weekly (from wallet to projects, investors to results)*

- *Firmness MDABRL parity with The Fiat Brazilian Reais*

- *Easiness Hyperledger Fabric Projects token flow integration to Moeda Seed Projects transparent accountability*

- *Hyper-secure from the top down: Private keys are always encrypted and cannot be extracted, imported or compromised*

- *Decentralized architecture: Transactions require multiple layers of authentication via key signing. No single point of failure*

Legal considerations

To achieve MOEDAs mission of connecting disadvantaged entrepreneurs to modern financial systems we aim to license our proprietary technologies and operate our fiat-crypto services in a global scale. That's why we have established Moeda's Exchange company in Uruguay free-trade zone, a special economic zone part of the Latin America Free Trade Association (LAFTA).

We are encouraged by the Uruguayan governments business-friendly environment and we have many advantages, including tax exemptions, unfettered foreign currency trading and logistical support. Also, the introduction and trade of foreign currency, gold, precious metals, and public values, is completely free.

Like in the rest of the Uruguayan territory, inflow and outflow of foreign currency is free.

U.S. investment bank Merrill Lynch, India's Tata Consulting and copier maker Ricoh are among international companies that have established operations in Uruguay's free-trade zones, according to published reports.

Moeda plans to maximize its use by being established in free-trade zones in Uruguay and other countries to improve the overall trade efficiency of its clients and partner organizations.

MOEDA has pledged to the Brazilian Central Bank, Brazilian tax authorities and regulatory bodies that it will maintain a transparent-and-compliant digital banking venture that will regularly provide information about its seed projects and other operations in the country.

External References and Miscellaneous

www.moedaseeds.com

Emoney Token Standard

Section 1: Summary

Use Case Summary			
Use Case ID:	FIN-008	**Use Case Type:**	*Vertical*
Submission Date:	July 19, 2019	**Is Use Case supporting SDGs**	*Yes*
Use Case Title:	Emoney Token Standard	**Domain:**	*1*
Status of Case	*In Production, ready.*	**Sub-Domain**	***B-*** International & interbank payments
Contact information of person submitting/ managing the use-case	*Full Name: Ismael Arribas* *Web site: **https://emoneytokenstandard.org/** standards@alastria.io*		
Proposing Organization	**Iobuilders** (Kingdom of Spain). B-88104054		
Short Description	A proposed standard for e-money, bank and central bank money issued tokens		
Long description	Financial institutions work today with electronic systems which hold account balances in databases on core banking systems. In order for an institution to be allowed to maintain records of client balances segregated and available for clients, such institution must be regulated under a known legal framework and must possess a license to do so. Maintaining a license under regulatory supervision entails ensuring compliance (i.e. performing KYC on all clients and ensuring good AML practices before allowing transactions) and demonstrating technical and operational solvency through periodic audits, so clients depositing funds with the institution can rest assured that their money is safe here are only a number of potential regulatory license frameworks that allow institutions to issue and hold money balances for customers (be it retail corporate or institutional types). The most important and practical ones are three: Electronic money entities: these are legally regulated vehicles that are mostly used today for cash and payments services, instead of more complex financial services. For example prepaid cards or online payment systems such as PayPal run on such schemes. In most jurisdictions, electronic money balances are required to be 100% backed by assets, which often entails holding cash on an omnibus account at a bank with 100% of the funds issued to clients in the electronic money ledger		

Banking licenses: these include commercial and investment banks, which segregate client funds using current and other type of accounts implemented on core banking systems. Banks can create money by lending to clients, so bank money can be backed by promises to pay and other illiquid assets

Central banks: central banks hold balances for banks in RTGS systems, similar to core banking systems but with much more restricted yet critical functionality. Central banks create money by lending it to banks, which pledge their assets to central banks as a lender of last resort for an official interest rate

Regulations for all these types of electronic money are local, i.e. only valid for each jurisdiction and not valid in others. And regulations can vary dramatically in different jurisdictions - for example there are places with no electronic money frameworks, on everything has to be done through banking licenses or directly with a central bank. But in all cases compliance with existing regulation needs to ensured, in particular:

Know Your Customer (KYC): the institution needs to identify the client before providing them with the possibility of depositing money or transact. In different jurisdictions and for different types of licenses there are different levels of balance and activity that can be allowed for different levels of KYC. For example, low KYC requirements with little checks or even no checks at all can usually be acceptable in many jurisdictions if cashin balances are kept low (i.e. hundreds of dollars)

Anti Money Laundering (AML): the institution needs to perform checks of parties transacting with its clients, typically checking against black lists and doing sanction screening, most notably in the context of international transactions
Beyond cash, financial instruments such as equities or bonds are also registered in electronic systems in most cases, although all these systems and the bank accounting systems are only connected through rudimentary messaging means, which leads to the need for reconciliations and manual management in many cases. Cash systems to provide settlement of transactions in the capital markets are not well connected to the transactional systems, and often entail delays and settlement risk.

The EM Token builds on Ethereum (Corda and others is under study), standards currently in use such as ERC20, but it extends them to provide few key additional pieces of functionality, needed in the regulated financial world:

Compliance: EM Tokens implement a set of methods to check in advance whether user-initiated transactions can be done from a compliance point of view. Implementations must `require` that these methods return a positive answer before executing the transaction

	Clearing: In addition to the standard ERC20 `transfer` method, EM Token provides a way to submit transfers that need to be cleared by the token issuing authority offchain. These transfers are then executed in two steps: 1. transfers are ordered 1. after clearing them, transfers are executed or rejected by the operator of the token contract	
	Holds: token balances can be put on hold, which will make the held amount unavailable for further use until the hold is resolved (i.e. either executed or released). Holds have a payer, a payee, and a notary who is in charge of resolving the hold. Holds also implement expiration periods, after which anyone can release the hold Holds are similar to escrows in that are firm and lead to final settlement. Holds can also be used to implement collateralization	
	Funding requests: users can request for a wallet to be funded by calling the smart contract and attaching a debit instruction string. The tokenizer reads this request, interprets the debit instructions, and triggers a transfer in the bank ledger to initiate the tokenization process	
	Payouts : users can request payouts by calling the smart contract and attaching a payment instruction string. The (de)tokenizer reads this request, interprets the payment instructions, and triggers the transfer of funds (typically from the omnibus account) into the destination account, if possible. Note that a redemption request is an special type of payout in which the destination (bank) account for the payout is the bank account linked to the token wallet	
	The EM Token is thus different from other tokens commonly referred to as "stable coins" in that it is designed to be issued, burnt and made available to users in a compliant manner (i.e. with full KYC and AML compliance) through a licensed vehicle (an electronic money entity, a bank, or a central bank), and in that it provides the additional functionality described above so it can be used by other smart contracts implementing more complex financial applications such as interbank payments, supply chain finance instruments, or the creation of EM-Token denominated bonds and equities with automatic delivery-vs-payment	
SDG in Focus (when applicable)	*SDG9 and SDG17*	
Value Transfer:	**We will transfer claims off-chain with on-chain proofs. Ponderation of attributes by causality. Verified authority to attest and authenticate an attribute.**	**Number of Users:**	First Po will happen in Spain (>45MM) but this solution aims to establish a global Identity system as an interplanetary badge. European Population and LAC.
Types of Users:	**People, Organizations, E.money entities, Banks, Central Banks**		

Stakeholders	*As we are proposing a money standards issuer and token holders are involved, that means any stakeholder is applied,*
Data:	*https://github.com/ethereum/EIPs/pull/2020* *https://emoneytokenstandard.org* All the data flow is fully detailed at https://github.com/IoBuilders/holdable-token https://github.com/IoBuilders/payoutable-token https://github.com/IoBuilders/clearable-token https://github.com/IoBuilders/fundable-token Privacy by design: unlinkable actions.
Identification:	*On next releases the idea is to link the identity to SSI schemas. Having said that all the information, balances, accumulates etc, want to be kept confidential. The standard workgroup is actively working on a confidential token approach, researching and implementing homomorphic encryption, range proofs, nnd pedersen commitments.* *https://crypto.stanford.edu/bulletproofs/*
Predicted Outcomes:	Ourion.io (IoBuilders project) is already live and shows a production ready application, working under the Alastria network, managing real tokenized euros. Other uses cases have deployed under Pegasys Pantheon and JP Morgan Quorum based networks. Adhara, has already deployed the standard under a Singapore, Philippines payment corridor project. Adhara is going to deploy a use case with the South African Rerserve Bank in Q4 2019. IoBuilders is going to deploy a use case with the BME, the Spanish CSD, on a bond issuing platform in Q4 2019.

Overview of the Business Problem or Opportunity
Blockchain technology is starting to be seen with huge potential to speed up the the fintech innovation. Banks and financial institutions, are envisioning smart money and payments scenarios leveraged by blockchain and smart execution. To enable fully regulated payment scenarios, with

fiat tokenized money, tokens must be issued under e-money/ bank / central bank rules, and directives.
Standardization is key to enable interoperability and cross use case integration. The standard has been started and developed with the aim of enable global interoperability, on tokenized fiat money issuances and payments..

Why Distributed Ledger Technology?
Advantages of fiat money tokenization on the blockchain are as following:
- Use of the universal blockchain protocol based on a continuous and interconnected chain of blocks that provides unification and universality of interactions for various market participants;
- High level of security due to inability to post-factum change the chain of blocks / tamper proof)
- Token issuers can directly communicate with parties interested in any payment use case
- Traceability
- Unique source of truth
- Auditability and transparency (by regulators)

Section 2: Current process

Current Solutions
On **Eurion.io** lowest KYC level, has been implemented, allowing to have a yearly 1000 € limit and 250 per operation

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
1.	User Identification (KYC)	As money holders, all users need to be identified. Either central banks, banks or e-money entities need to identify users, following the established KYC rules. Based on the level of identification, users are able to manage different amounts of money.
2.	Cashin	Cashin is done via the banking system, either using payment gateways or SEPA, SWIFT communication

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
3.	Transfer	SEPA, SWIFT communication based on ISO 20022 payments standards and bank integrations
4,	Transfer with Hold	SEPA, SWIFT communication with ISO 20022 payments standards and bank integrations
5.	Cashout	SEPA, SWIFT communication with ISO20022 payments standards and bank integrations

Process scheme (as-is)

Flow of a traditional business with payments integrated

Data and information (as-is)		
Data	**Type**	**Description**
1	*Documents*	All the identification process has important documents associated: KYC0: OTP validated mobile phone KYC1: Validated ID document KYC2: Biometric patterns linked to ID, income data, and personal IBAN Information KYC4: KYC template
2	*Payment transactions*	Cashin, Transfer and cashout

Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
1	*Lawyers*	Kyc and AML process definition
2	*Bank, Central Bank, and Emoney License*	Money issuer
3	*User*	Money holder
4	*Clearing Agent*	Allows a clearable operation to be fulfilled

Other Notes
No.

Section 3: Expected process

Step	User Actions	System Actions
Expected Flow (TO BE)		
1.	User Identification (KYC)	As money holders, all users need to be identified. Either central banks, banks or e-money entities need to identify users, following the established KYC rules. Based on the level of identification, users are able to manage different amounts of money. On Eurion.io lowest KYC level, has been implements, allowing to have a yearly 1000 € limit and 250 per operation. On chain configuration is done via EIP 2009
2.	Cashin	Once users have been identified, they can start using tokenized cash. There are 2 ways of being able to receive tokenized money, via an existing user that natively transfers money, or via baking system based cashin operation, either via credit card or SEPA transfer. All Eurion users, have an unique IBAN associated to its ethereum address.
		This cashin operation, can be executed on a centralized or decentralized way, via the funding method provided by the standard. On invocation, the token issuer, will read the payment transaction and mint the required tokens (EIP 2019)
3.	Transfer	A native transfer between token holders.
4,	Transfer with Hold	In some cases, native transfer want to be validate or cleared by a third party, On this case mixing the hold and clearing capabilities of the standard, such kind of transactions can be easily implemented.(EIP 2019)
5.	Cashout	An cashout operation, can be executed on a centralized or decentralized way, via the payout method provided by the standard. On invocation, the token issuer, will read the payment transaction and burn the required tokens. (EIP 2021)

Process scheme (to-be)

Money tokenization explanation
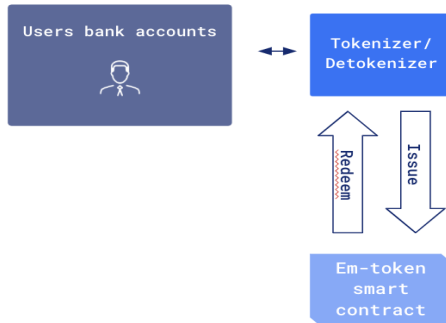
- When money reaches the account of a user of ioCash, the bank/EME notifies us.

- The tokenizer issues the corresponding amount of tokens over the decentralized ledger into our Em-token smart contract

- Now, money is digital, programmable and interoperable

- When the user orders a redemption, the detokenizer burns the tokens on the smart contract

- Money is moved from the client ioCash account to the destination

Participants and their roles		
Actor	**Type/Role**	**Description**
1	*Lawyers*	Kyc and AML process definition
2	*Bank, Central Bank, and Emoney License*	Money issuer
3	*User*	Money holder
4	*Clearing Agent*	Allows a clearable operation to be fulfilled
5	*Hold Operator*	Allows a held operation to be fulfilled

Data and information		
Data	**Type**	**Description**
1	*Documents*	All the identification process has important documents associated: KYC0: OTP validated mobile phone KYC1: Validated ID document KYC2: Biometric patterns linked to ID, income data, and personal IBAN Information KYC4: KYC template
2	*Payment transactions*	Cashin, Transfer and cashout

Security and privacy
All the standard is based on current ethereum capabilities and ourion.io has been developed following all the security and ISO standards and specifications.

Main Success Scenario + expected time line
Ourion.io (IoBuilders project) is already live and shows a production ready application, working under the Alastria Ecosystem, managing real tokenized euros. Other uses cases have deployed under Pegasys Pantheon and JP Morgan Quorum based networks.   Adhara, has already deployed the standard under a Singapore, Philippines payment corridor project.   Adhara is going to deploy a use case with the South African Reserve Bank in Q4 2019.   IoBuilders is going to deploy a use case with the BME, the Spanish CSD, on a bond issuing platform in Q4 2019.

Conditions (pre- or post-)
Non applicable.

Performance needs
Current Ethereum landscape is totally focused on scalability, due the low transnationality, thoughput available either on private or public networks..

Legal considerations
Electronic Money License, Anti-money laundering compliance and KYC regulation.

Risks
Scalability and confidentiality. (mentioned before)

Special Requirements
Financial institutions share a common platform and data overview.

External References and Miscellaneous
https://io.cash/product/

Other Notes
It is possible to be tested for free by the ITU-T FG DLT experts and members.

Appendix 1:
Domains and subdomains for use cases categorization

Vertical:

1. Finance
   a. Financial management & accounting
   b. International & interbank payments
   c. Clearing and settlement
   d. Reduction of Fraud
   e. Financial messaging
   f. Asset lifecycles and history
   g. Trade finance
   h. Regulatory compliance & audit
   i. AML/KYC
   j. Insurance
   k. Peer-to-peer transactions
2. Healthcare
   a. Pharma
   b. Biotechnology
   c. Medicine
3. Industries
   a. Manufacturing
   b. Energy
   c. Chemical
   d. Retail
   e. Real estate
   f. IT and telco
   g. Supply chain management
   h. Transportation
   i. Agriculture
4. Government and public sector
   a. Taxes
   b. Government and non-profit transparency
   c. Legislation, compliance & regulatory oversight
   d. Voting
   e. Taxation and customs
   f. Intellectual property management
   g. Land Registries

Horizontal:

1. Identity management
2. Security management
   a. Public Key Infrastructure
3. Internet of Things

4. Data processing, storage and management
    a. Data Validation (includes provenance)

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