Trubudget for the Amazon Fund

Section 1: Summary

Use Case Summary			
Use Case ID:	GOV-002	**Use Case Type:**	*Vertical*
Submission Date:	March 22, 2019	**Is Use Case supporting SDGs**	*Yes*
Use Case Title:	Trubudget for the Amazon Fund	**Domain:**	*4. Government and public sector*
Status of Case	*Pilot*	**Sub-Domain**	*b. Government and non-profit transparency*
Contact information of person submitting/ managing the use-case	*José Nogueira D'Almeida Jr.* *Software Engineer* *nogueiradalmeida@gmail.com* *+55 (21) 97189-2811* *https://www.linkedin.com/in/nogueiradalmeida/* ***www.bndes.gov.br***		
Proposing Organization	*BNDES – Brazilian Development Bank*		
Short Description	*Trubudget for the Amazon Fund is a blockchain system that improves the reliability of the information providing the money tracking for the investments of Amazon Fund in Brazil.*		
Long description	*The Amazon Fund is a REDD+ mechanism created to raise donations for non-reimbursable investments in efforts to prevent, monitor and combat deforestation, as well as to promote the preservation and sustainable use in the Brazilian Amazon.* *The Amazon Fund is managed by BNDES, the Brazilian Development Bank, which is responsible for raising and investing funds, monitoring the projects supported, rendering accounts and communicating results obtained.* *Germany is one of the main donors of Amazon Fund. The Germany's Development Bank KfW and BNDES are cooperating to use the blockchain technology to record how funding is spent. The Trubudget is a generic blockchain system that allows to register workflows. The Trubudget for the Amazon Fund is an use case that registers the money flow. It started in 2017, it had a Proof-of-Concept Phase in 2018 which consisted in simulations with real clients and in 2019 is in the Pilot Phase, which consists in real disbursement monitored and controlled by the blockchain. The payments process from BNDES to its Clients was the choice to be recorded on Trubudget blockchain in the Pilot Phase.*		

SDG in Focus (when applicable)	*Goal 6 – Clean Water and Sanitation* *Goal 13 – Climate Action* *Goal 15 – Life on Land* *Goal 16 – Peace, Justice and Strong Institutions* *Goal 17 – Revitalize the global partnership for sustainable development* *All these objectives are related to the Amazon Fund and the Trubudget aims to improve the management of it.*		
Value Transfer:	*There is no value transfer in the blockchain solution described. This is a declarative ledger.*	**Number of Users:**	*30+*
Types of Users:	*BNDES Business Analyst* *BNDES-Clients Business Analyst* *Auditors* *Donors* *Government agencies*		
Stakeholders	*BNDES, KfW(Germany), Petrobras, TCU (government agency), Norway*		
Data:	*Users* *Projects* *Subprojects* *Workflow items* *There is a communication between Trubudget and the ERP System, which every disbursement that occurs in the ERP, it makes a new record in the respective Trubudget Subproject.*		
Identification:	*Every user has credentials (login and password) to use the system. Some users have admin power, which means that they can create other credentials.* *Projects, Subprojects and Workflows items need permission of its owner to read/write.*		
Predicted Outcomes:	Trubudget aims to be an additional source of information in a blockchain for the stakeholders monitor the Amazon Fund projects. The system is able to provide the Client's, BNDES and Donors access to the same data at any time. This is similar to the Circularization technique commonly used by Audit companies, when the auditor sends a letter directly to a third party to confirm an information about the audited organization. In a future phase, it can replace some process/report that is currently made offchain.		

Overview of the Business Problem or Opportunity
The donors of Amazon Fund and BNDES could be concerned about the correct use of the disbursements for the projects executed by their clients, generally NGOs. This system can improve the timing of the information and the reliability of it.
Why Distributed Ledger Technology?
Every stakeholder (Donor, BNDES, Clients/NGOs) has its system and provide the information of money expenditure using the traditional ways (emails, documents, spreadsheets, receipts, etc). The Trubudget for the Amazon Fund integrates this information in one blockchain system, where

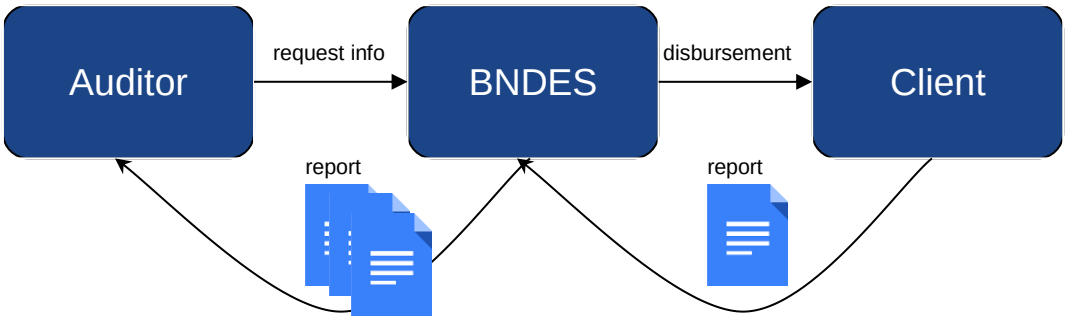
the data is immutable, secure, verifiable and transparent.

Section 2: Current process

Current Solutions
The disbursements of BNDES are made to its Clients using the traditional Brazilian Payment System (SPB). The Clients executes the project according to the Amazon Fund principles and then reports the expenditure to BNDES. BNDES aggregates all its Clients reports and make its reports to the donors periodically.

Existing Flow (as-is)		
Step	**User Actions**	**System Actions**
1.	BNDES Analyst submits a disbursement in the ERP system	The ERP system sends a disbursement through the Brazilian Payment System
2.	The Client checks the project bank account	No system action
3	BNDES periodically reports to the Auditor how and when the money was spent	No system action

Process scheme (as-is)



Data and information (as-is)		
Data	**Type**	**Description**
1	*Documents*	A report of project ongoing results must be send to BNDES, who manages the Amazon Fund. BNDES collects all those results from its clients, make analysis and then produce its reports to the auditors (donors and government agencies).

2	*Payment transactions*	The Clients' expenditures receipts must be send to BNDES.

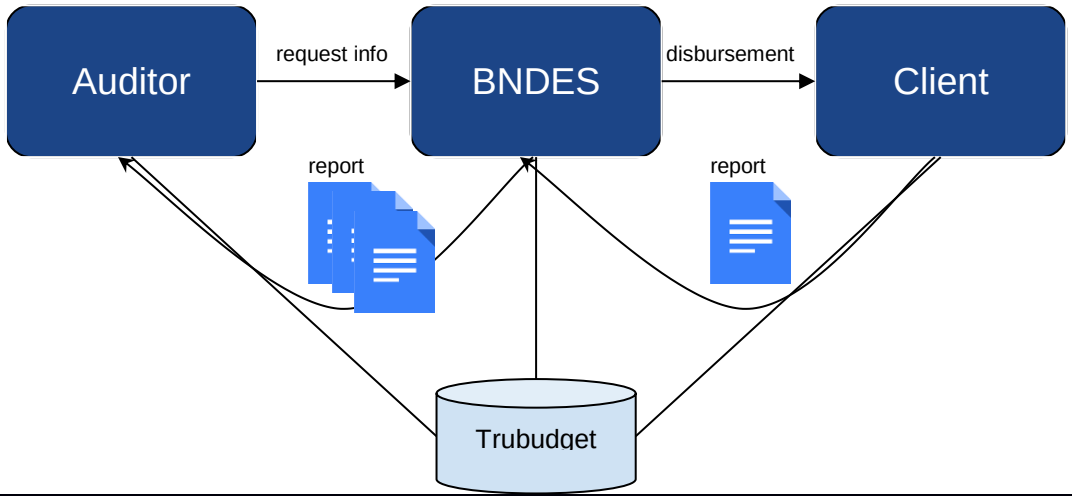
Participants and their roles (as-is)		
Actor	**Type/Role**	**Description**
1	*BNDES*	Manages the Amazon Fund and evaluate the results of ongoing projects and approves/rejects new projects
2	*KfW/Norway*	Monitor their donations and audit the BNDES management
3	*TCU (as example)*	Audit the BNDES Amazon Fund management
4	*BNDES Clients*	Executes the projects and report the results

Other Notes
N/A

Section 3: Expected process

Expected Flow (to-be)		
Step	**User Actions**	**System Actions**
1.	BNDES Analyst submits a disbursement in the ERP system	The ERP system sends a disbursement through the Brazilian Payment System and this payment is loaded into Trubudget Ledger. Trubudget sends an email to the Clients
2.	The Client checks the project bank account and then approves the receipt in the Trubudget Ledger.	Trubudget sends an email to BNDES team
3	The Auditor logs on Trubudget at any time and check the money flow for every iteration described in the steps 1 and 2	Trubudget shows every money step through the ledger

Process scheme (to-be)



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3	*Trubudget Workflow*	All the stakeholders can access Trubudget at any time to check daily the status of each project of the Amazon Fund.

Security and privacy
Application security: *The Trubudget has access control to login into the system, as well it offers specific permission for each project, subproject and workflow item.* *Network security:* *The Trubudget network is a permissioned blockchain based on Multichain. Therefore only the approved nodes have the grants to join on this. Currently there are two nodes: BNDES and KfW. Norway and Petrobras were invited to join. The Clients uses the BNDES frontend node.*

Main Success Scenario + expected time line
Description of DLT-based solution, which potentially will be created

Conditions (pre- or post-)
Not applicable

Performance needs
Trubudget is based on Multichain permissioned blockchain technology. *The confirmation time in a permissioned networked the can vary according to the consensus mechanism, number of nodes, etc. Trubudget does not require real-time update for all nodes. It is desired and viable a few minutes of confirmation time.* *Trubudget already contains a Restful API, which supports external calls from other systems.* *A few transactions per day are expected on Amazon Fund and since Trubudget is based on Multichain permissioned blockchain technology, the transaction throughput is not an issue.* *"In MultiChain you can set the block size limit much higher (up to 1 GB) and the block time much lower (down to 2 seconds), so based on this calculation it could process over 2 million tx/second. But for now the codebase itself can handle a little over 1000 tx/second on mid-range hardware, using either the multichain or bitcoin protocol. (In reality you would also have to consider the connection between block size and propagation latency which affects the minimum viable block time." [https://www.multichain.com/qa/5556/about-throughput-performance]*

Legal considerations

There is a possibility that Trubudget could not replace any of the current processes and/or reports because legal and regulatory rules. In fact, at this point, we are considering Trubudget as an additional source of information.

The General Data Protection Regulation in EU law was a concern because Trubudget stores every single data in its blockchain, including emails. Therefore, we decided to use corporate emails to keep only corporate data and avoid personal data.

Risks

Legal, business and technical risks related to use case

The information provided on Trubudget is already open and public by the Amazon Fund.

Trubudget is an opensource project under the MIT License. The software uses other opensource libraries and modules and these external modules can have vulnerabilities.

Special Requirements

The agreement between KfW and BNDES was formalized by a Memorandum of Understanding and if someone does not follow the rules, it can affect the business.

External References and Miscellaneous

KfW Trubudget site:

https://openkfw.github.io/trubudget-website/

Trubudget for the Amazon Fund Video Demo:

https://www.youtube.com/watch?v=0tysH44dzm8&feature=youtu.be

BNDES Trubudget site:

www.bndes.gov.br/trubudget

The Trubudget source code:

https://github.com/openkfw/TruBudget

The ETL SAP-Trubudget source code:

https://github.com/bndes/trubudget-bndes

Other Notes

Trubudget for Amazon Fund is workflow management system that tracks the money flow in a blockchain. Its use case is simple. It is an additional and reliable source of information for different stakeholders to follow the donations of the supported projects for the Amazon Forest.

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)