Satellite Imagery and Land Registries on Blockchain

Francesco Cimmino
Research Officer
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ESA Phi-Week

BLOCKCHAIN & CLIMATE INSTITUTE

Blockchain & Climate Institute (BCI)

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WHO WE ARE

- Volunteers-led, not for profit combining the functions of a think-tank and an advocacy group
- We support governments and businesses in the deployment of blockchain and emerging digital technologies in climate change policy implementation

OUR MISSION

"Our mission is to effect positive changes to the global climate change governance by raising awareness among the international climate change policy community of the tremendous potential of blockchain technology to considerably enhance state and non-state climate actions".

- BCI Mission Statement

WE ARE RECRUITING VOLUNTEERS!

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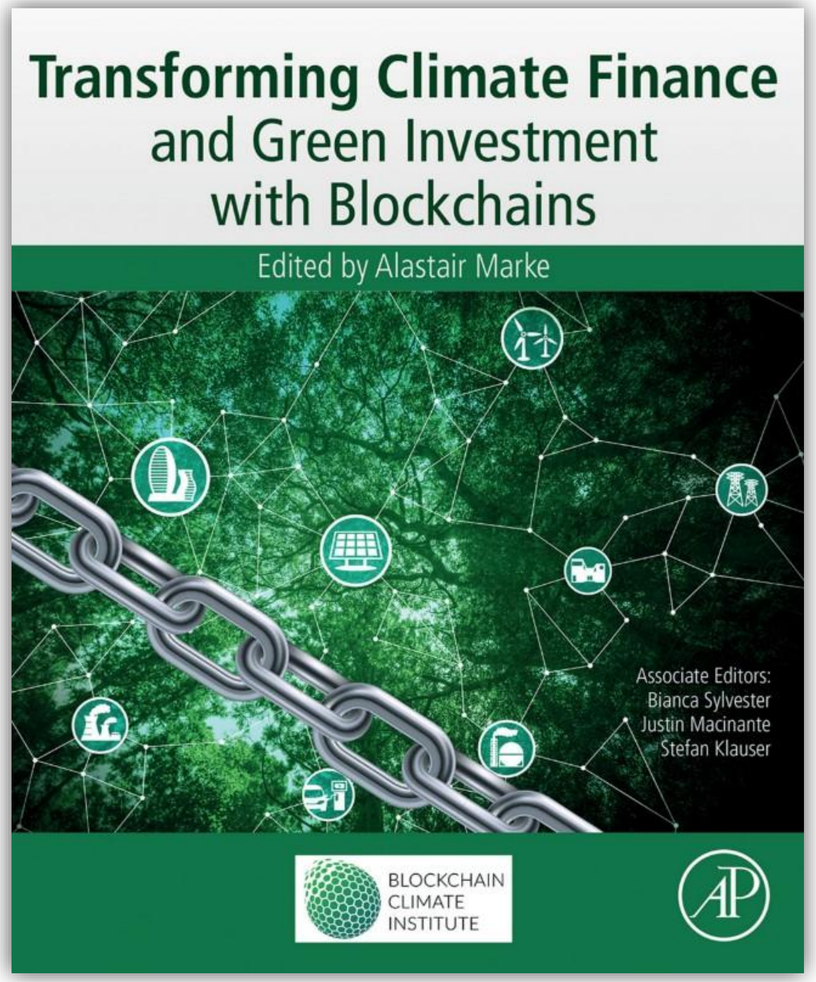
The world's first book combining blockchain and climate change policy issues

Now available in nearly 150 university libraries



http://www.blockchainclimate.org

info@blockchainclimate.org

Seminar Outline

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1. **A three-fold problem:**
   - Land use, Land-use Change and Forestry (LULUCF) Activities
   - Inefficiencies in Traditional Land Registries
   - Lack of credible and comprehensive data backing land registries
2. **LULUCF**
   - Definition
   - Activities & Challenges
3. **Traditional Registries**
4. **Data Problem**
5. **A “Blockchainised” Solution**
6. **Blockchain Land Registry for LULUCF Activities**
7. **EO-based Geo-Information Instruments**
8. **Blockchain Land Registries Outlook**
9. **Key Takeaways**
10. **Q&A**

The Problem

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A Three-Fold Problem:

1. **Land use, Land-use Change and Forestry Activities**
2. **Inefficiencies in Traditional Land Registries**
3. **Lack of credible and comprehensive data backing land registries**

LULUCF Definition

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Land use, land-use change and forestry (LULUCF) is defined as

“A greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human-induced land use, land use change and forestry activities.”

LULUCF Activities & Challenges

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Agriculture

- Enteric fermentation (animal digestion resulting in increased methane emissions)
- Rice cultivation
- Synthetic fertilizer use
- Burning of crop residues
- Organic soil erosion

Forestry

- Conversion of forests to pastureland
- Logging
- Forest fires
- Mass infrastructure development

Deforestation and forest degradation are responsible for about 15% of global greenhouse gas emissions.

Challenge: Effectively Monitoring & Verifying LULUCF Activities

Traditional Registries

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Vulnerabilities:

- Keeping registries up-to-date
- Tampering, damage and loss

Leading to:

- Unclear ownership
- Lock land into unproductive use
- Limiting investments and market transactions
- Lower tax revenues

The “Data” Problem

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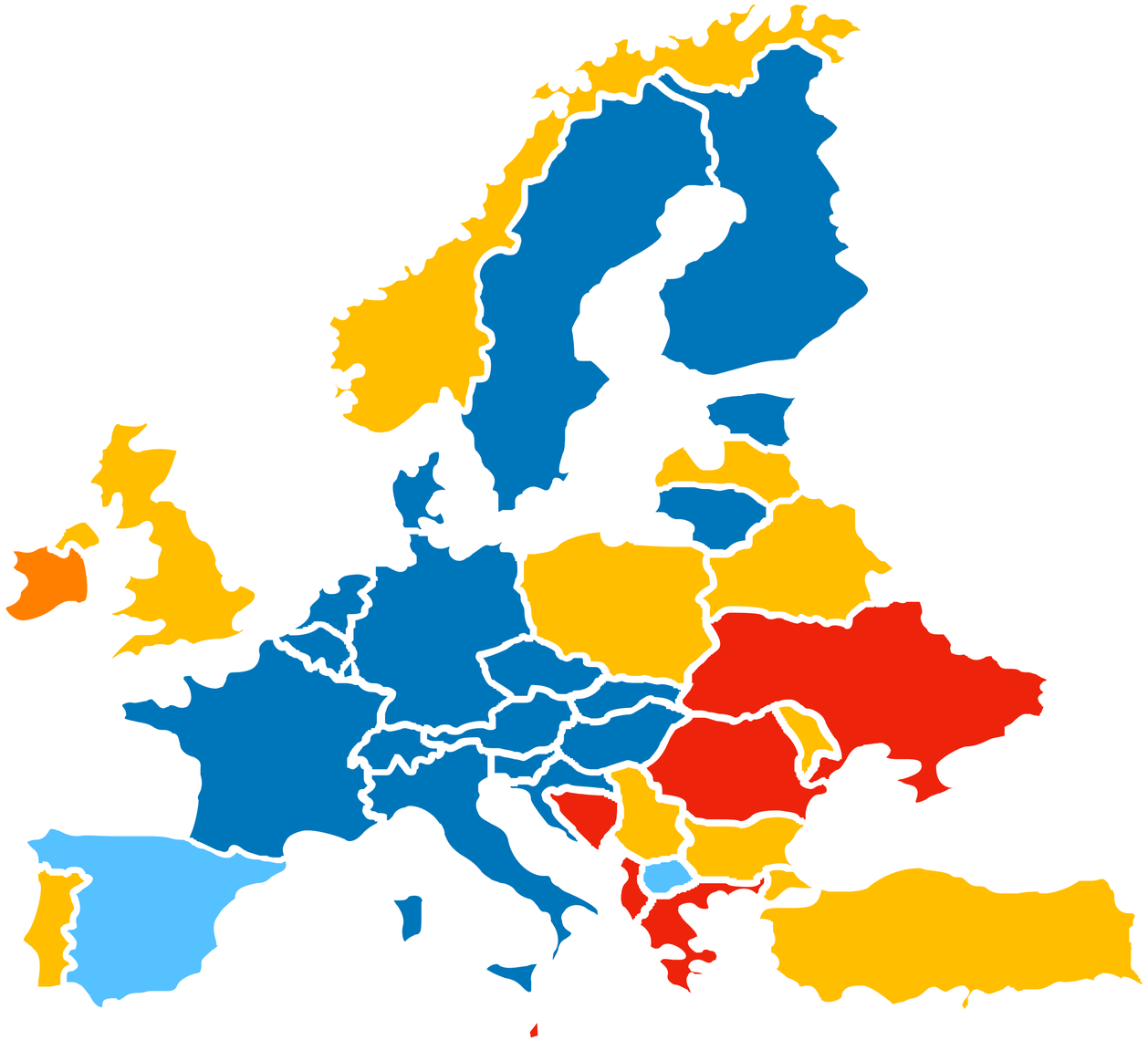

World’s Bank Geographic Coverage Index

Country	Index (0-8)
Albania	0
Belarus	4
Bosnia	0
Bulgaria	4
Greece	0
Ireland	2
Latvia	4
Malta	0
Moldova	4
Norway	4
Poland	4
Portugal	4
Romania	0
Serbia	4
Turkey	4
United Kingdom	4
Ukraine	0

A “Blockchainised” Solution

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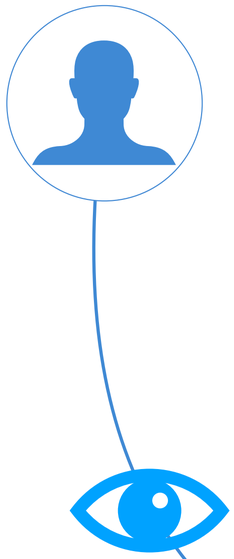
Traditional Registry - *3 Days*

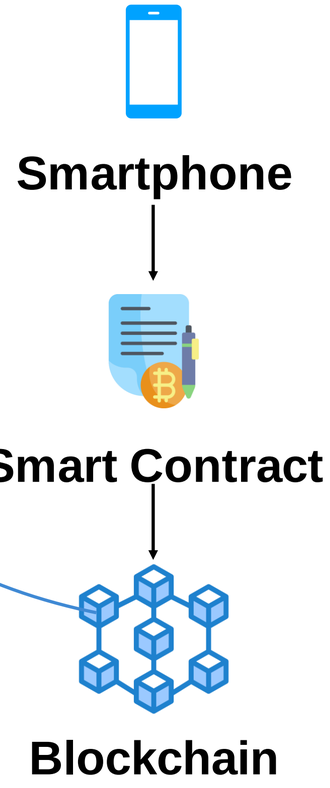
Expensive process

Risk of fraud

High transaction costs



Blockchain Registry - *10 minutes*



Operations are carried out instantly

Built in transparency

Trusted Records

OPEX REDUCED BY UP TO 90%

A “Blockchainised” Solution

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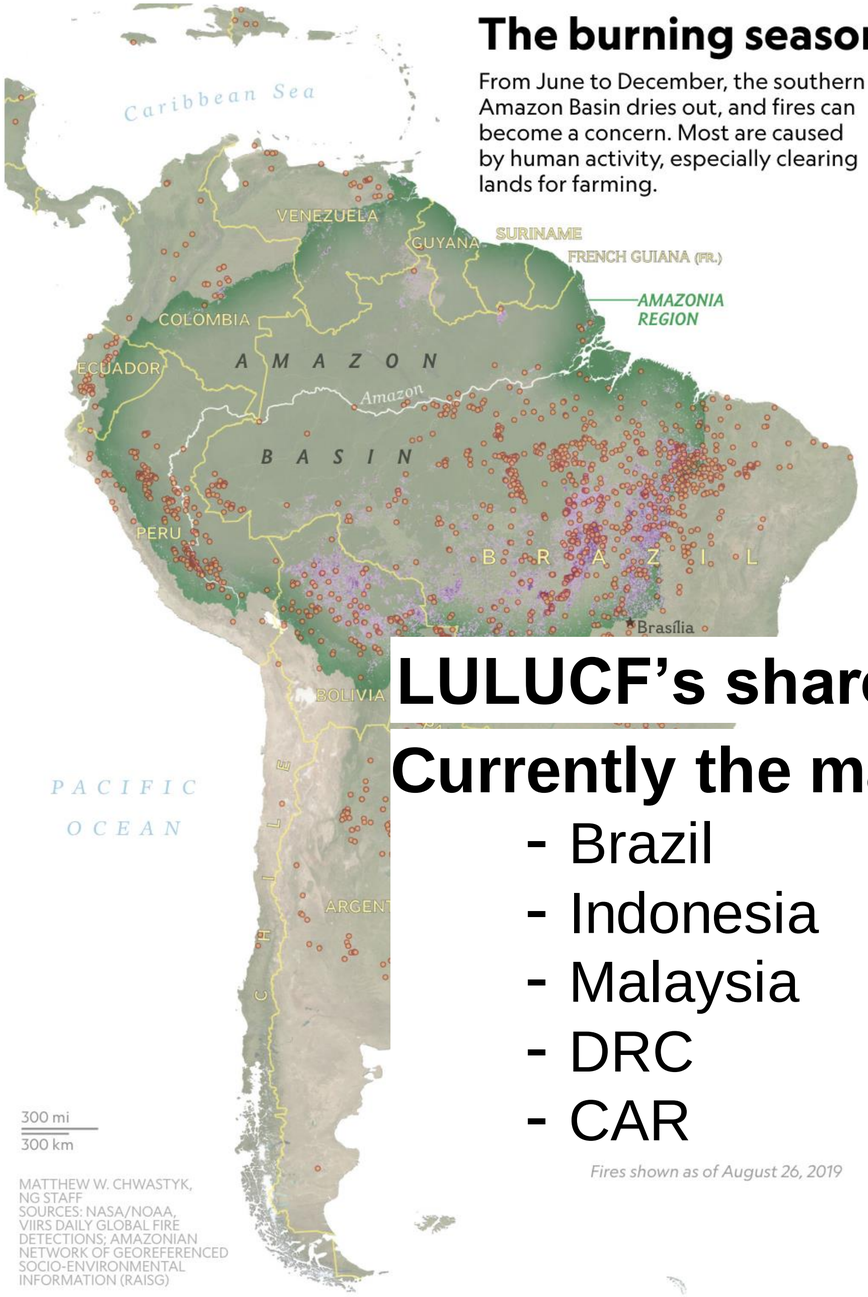
Citizen initiates his request via service hall or mobile application

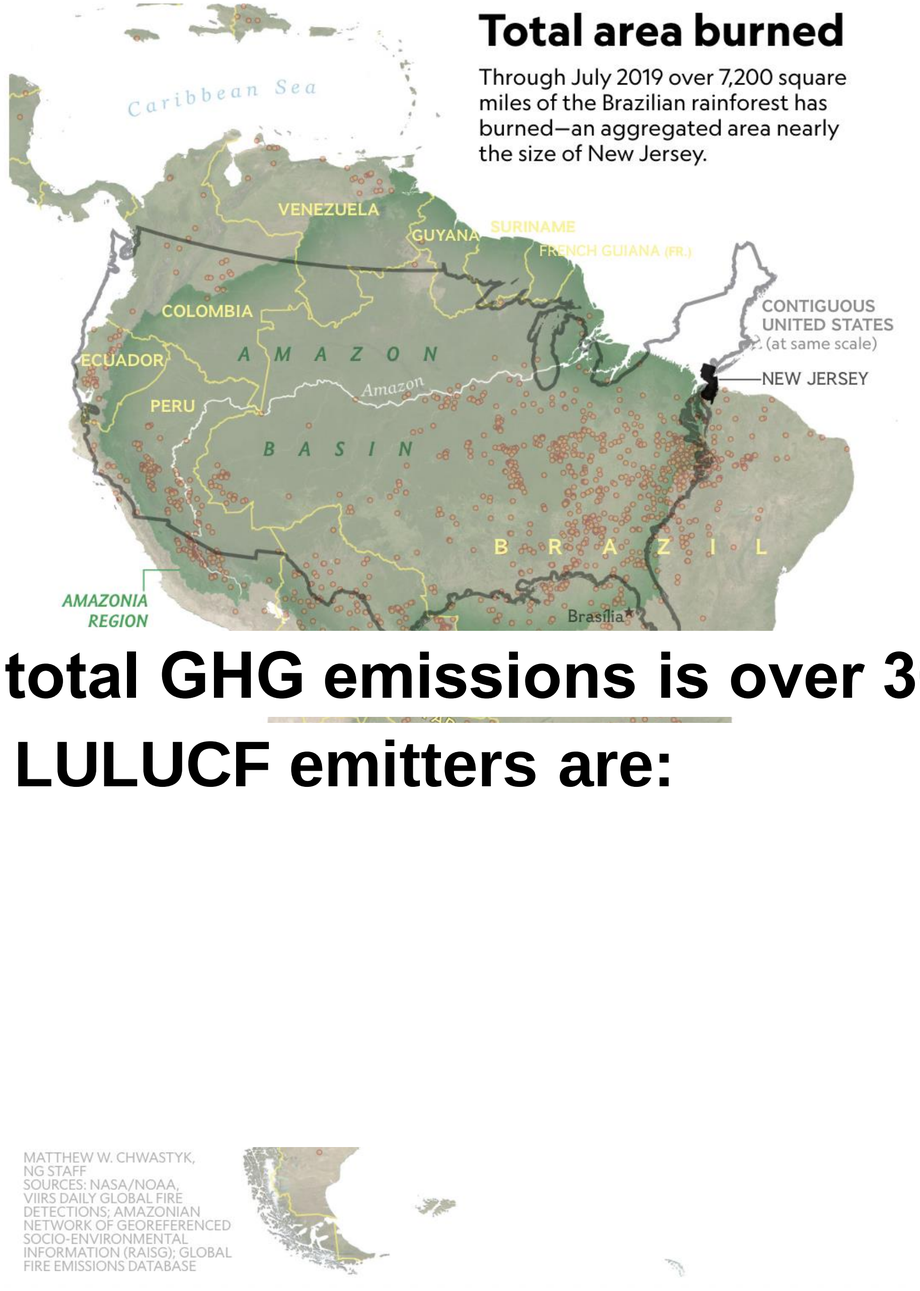
Server creates and verifies blockchain transaction

Blockchain stores system snapshot hashes to prevent possible collusion

Existing software is used to process the request

Blockchain executes contracts specific to requested action





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LULUCF's share of total GHG emissions is over 30%

Currently the major LULUCF emitters are:

- Brazil
- Indonesia
- Malaysia
- DRC
- CAR

Blockchain Land Registry for LULUCF

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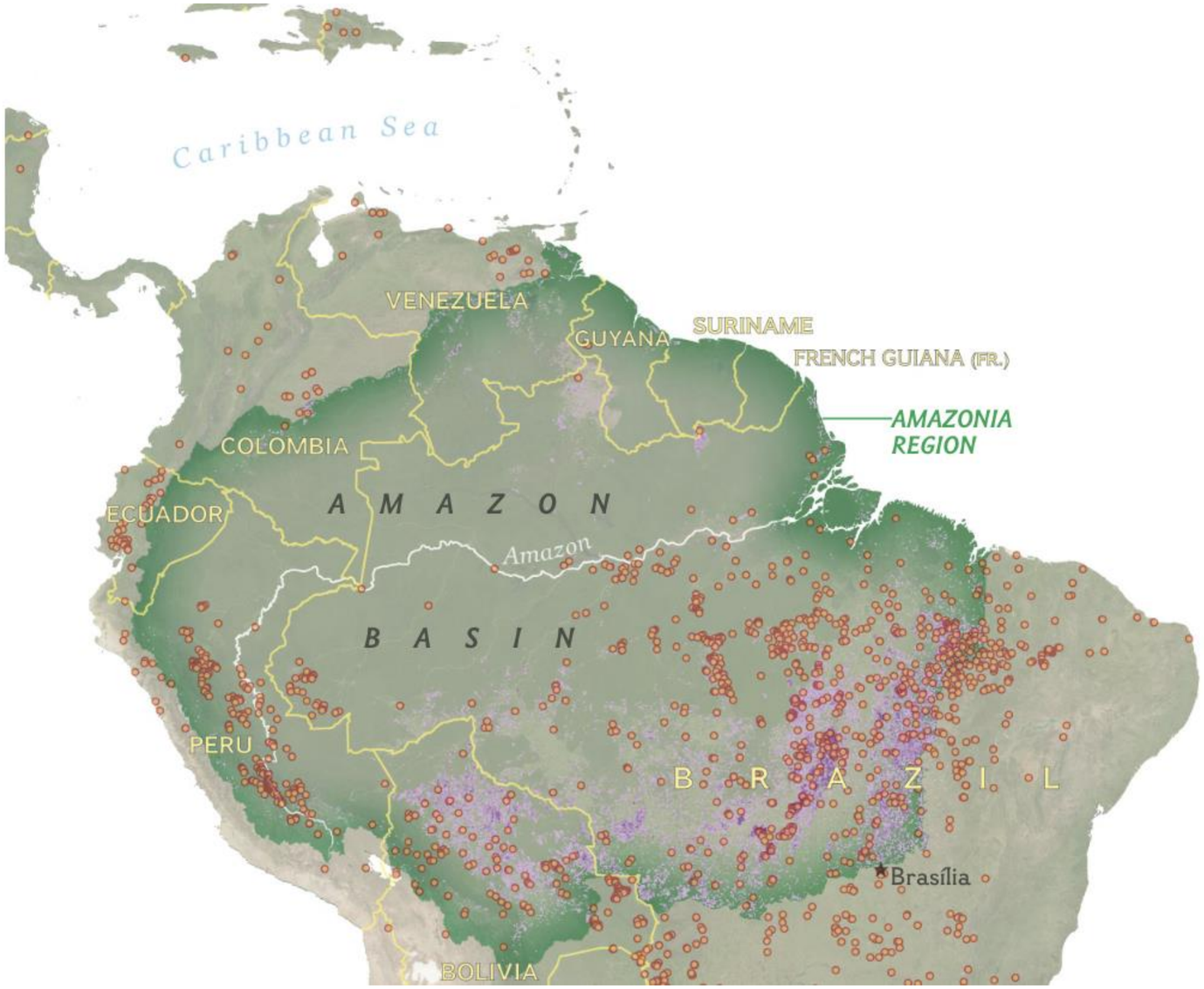
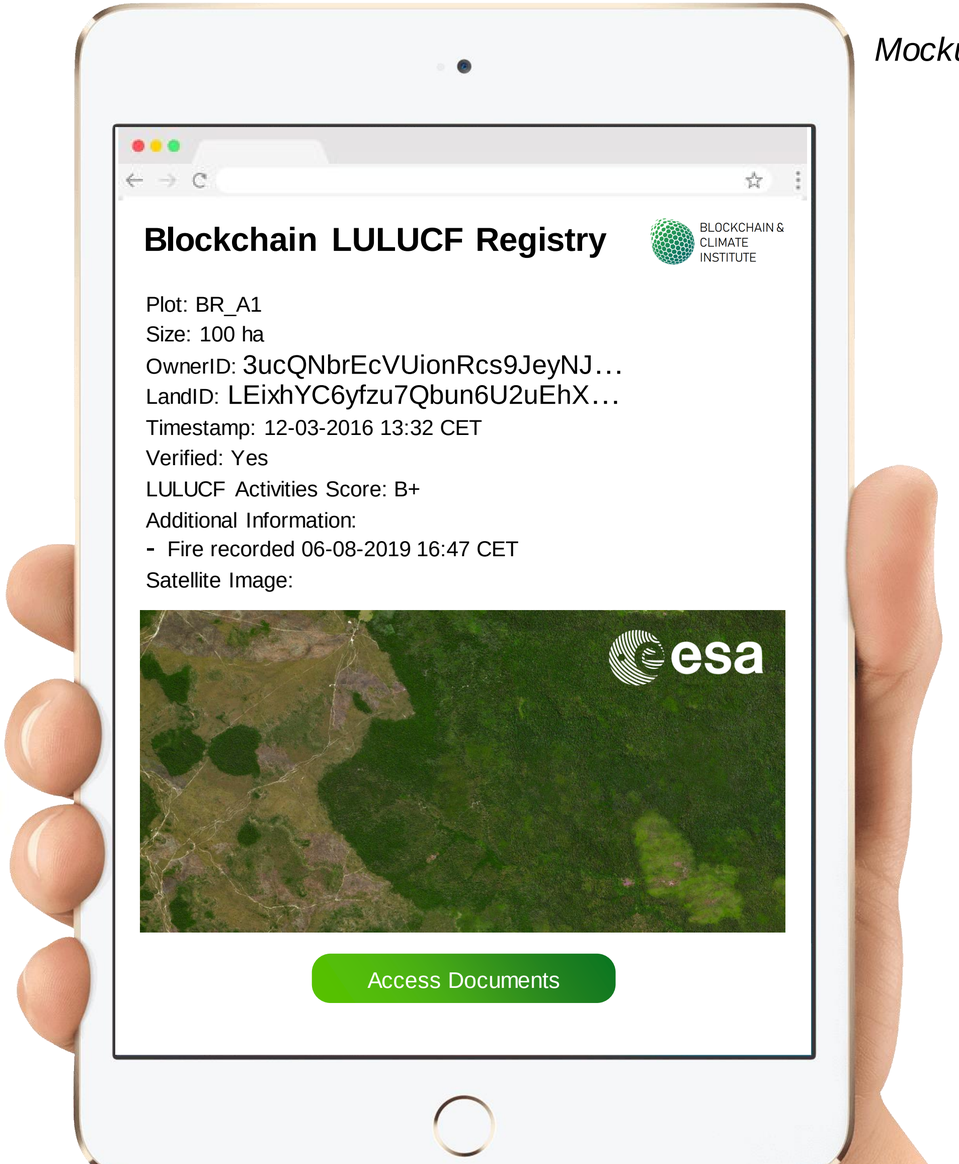


Mockup



Blockchain Land Registry for LULUCF

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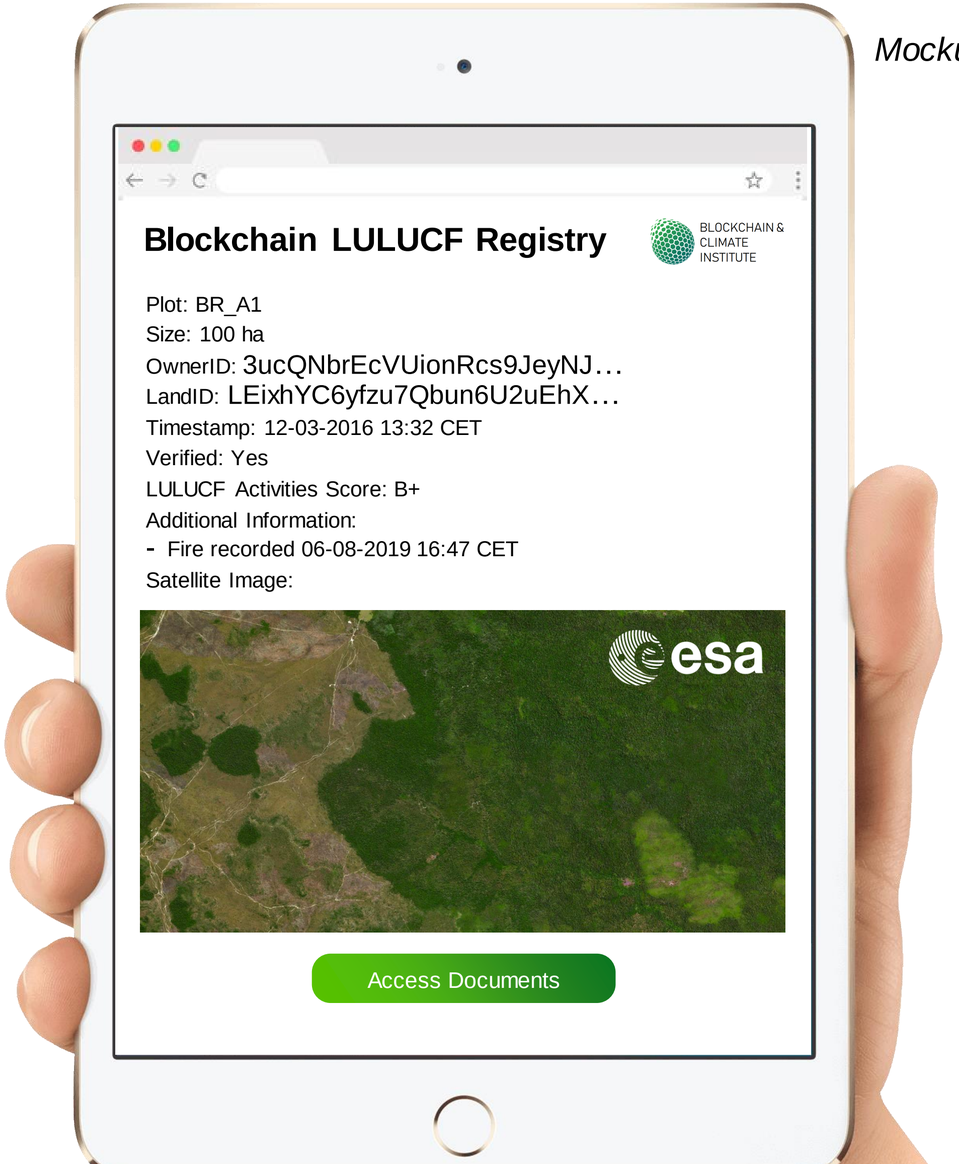
Advantages

- Near Real-Time Monitoring of LULUCF Activities
- Ensure sustainable land-use
- Retrospective and real-time auditability
- Property title cannot be tampered
- Clear trail to the ownership of the land
- Assess LULUCF Activities of Enterprises
- Remove the ‘trust problem’

Mockup



EO-based Geo-information Instruments

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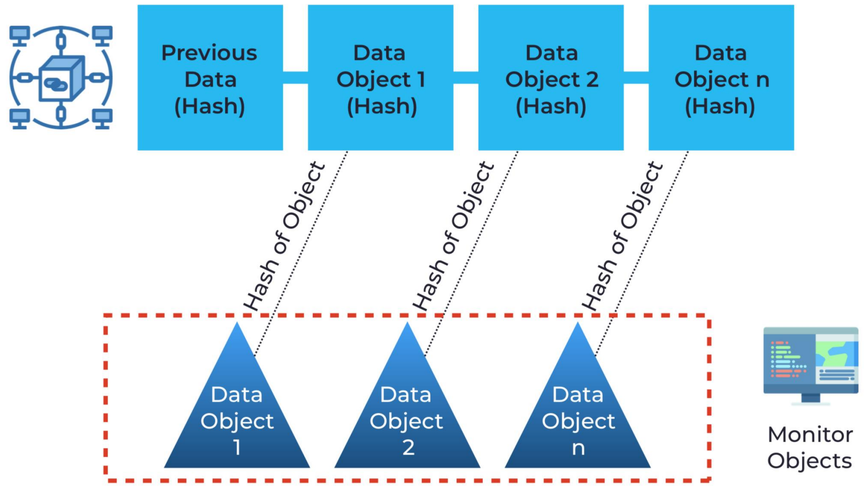
Does Blockchain itself really solve the 'trust problem'?

How do we ensure the data uploaded onto the blockchain is accurate?

- The data itself is not actually saved on the blockchain
- Its hash is uploaded and saved on the blockchain
- If the data object is being altered, the hash will change too - any alteration in the data can be discovered!
- **Trusted quality of data: ESA EO-based geo-information**



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Blockchain Land Registries Outlook

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Existing Applications

Georgia, 2016
1.5+ Land titles registered on BitFury's private blockchain, Exonum

Sweden, 2017
Kairos Future estimates over €100m a year in savings to the Taxpayers

India, 2018
Haryana State to implement a PoC to register land titles on blockchain

United Kingdom, 2019
The trial involved the sale of a semi-detached house in Gillingham, Kent.

Many others in small municipalities in

No Applications for LULUCF Yet!

Key Takeaways

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- Blockchain: An opportunity to develop efficient tools to monitor:
  - LULUCF Activities
  - Assess enterprises sustainability performance
  - Measure deforestation
- Challenges include:
  - Digitisation of registries
  - Accurate inputs on blockchain
- Satellite imagery represent a new possibility for digital land records
  - Technology could play a complementary role to establishing blockchain registries

Thank you for listening.
Any questions?

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