TERMS OF REFERENCE (TOR)

Blockchain Hackathon

GovTech Agency

Table of Content

1. Background

The existing eSakor system was developed to digitize land records and transactions, and it operates on a centralized architecture that can become increasingly susceptible to fraud and data manipulation. The rise in fraudulent land transactions due to these vulnerabilities will present a significant risk to the integrity of land records. To enhance security and transparency in land transactions, the GovTech Agency proposes a two-phase approach Hackathon.

While blockchain has been widely discussed internationally, its implementation in Bhutan remains in a nascent stage. In particular, the development of Decentralized Applications **(DApps)** within the context of public services, such as land registry has not been explored.

This hackathon represents a greenfield research opportunity, where no prior local implementations exist. The objective is to understand the potential and limitations of blockchain technology in this critical domain by engaging Bhutanese IT firms in a real-world development and experimentation process.

2. Theme

The theme of the event will be **"Unlocking Blockchain Technology's Potential in Land Registry."** The participants will aim to build a Proof of Concept (POC) that enables transparent and secure land transactions using blockchain technology.

3. Objectives

The following objectives are proposed to support the implementation for Phase I:

3.1. Develop innovative solutions by implementing blockchain technology with smart contracts to streamline ownership transfers and ensure trust in land transactions through automated escrow mechanisms.

3.2. Enhance transparency, reduce fraud, ensure secure and verifiable land ownership records by using non-fungible tokens and the immutable nature of blockchain.

3.3. To generate research insights into the applicability of blockchain for decentralized and transparent land ownership systems.

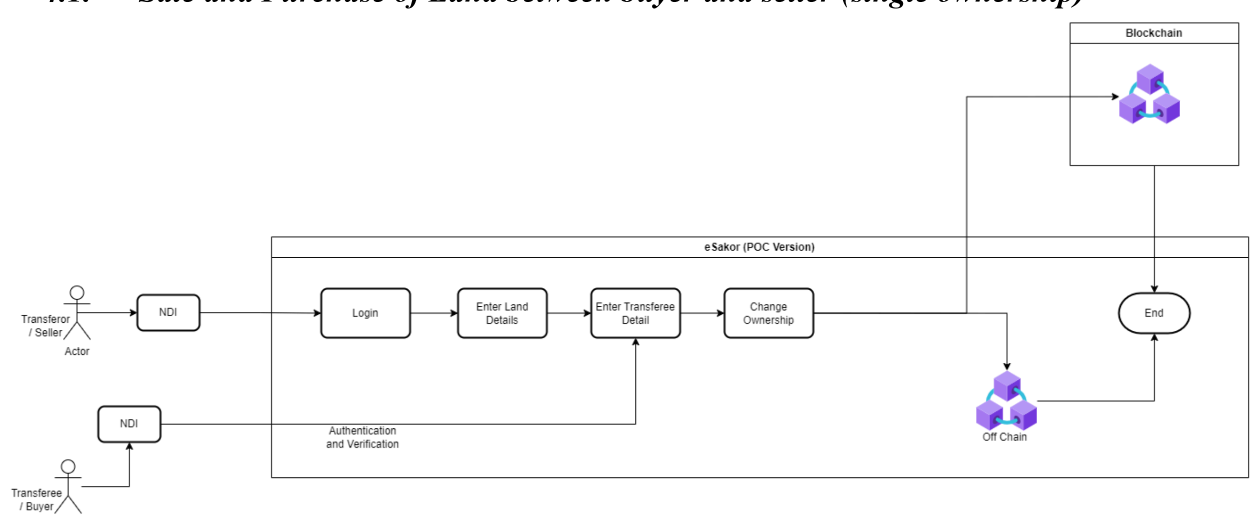
3.4. To evaluate the technical and conceptual readiness of national IT firms in developing blockchain solutions.

3.5. To pilot a new research methodology combining hackathons and R&D for emerging technologies.

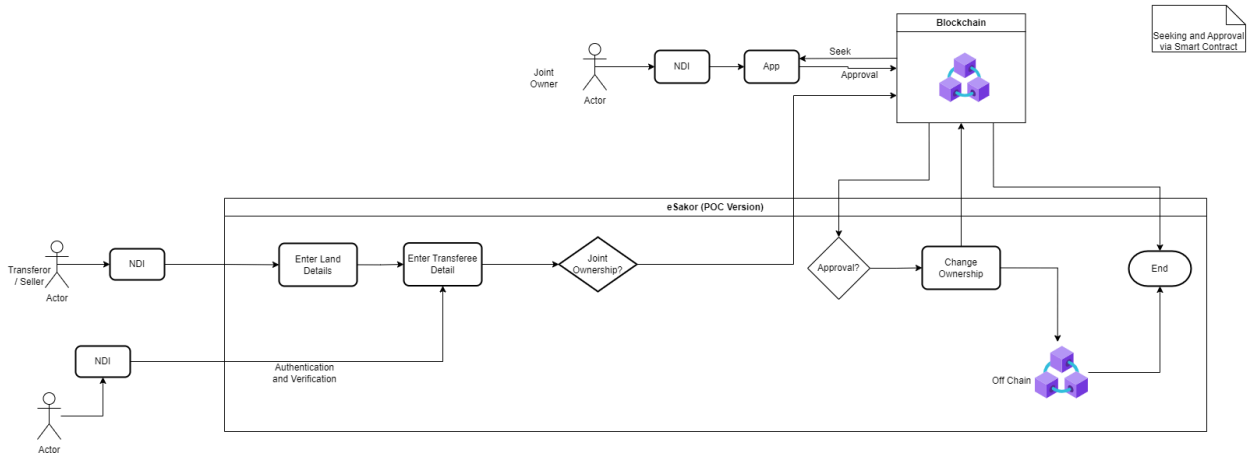
4. Scope

Phase I: The first phase will focus on developing a simplified land transaction use case—specifically sales and purchases—as a means to evaluate the capabilities of participating vendors in implementing blockchain technology. Participants will work on the outlined scenarios, using the provided diagrams as general references. However, creativity and innovation beyond the suggested models are strongly encouraged. During an intensive three-day design sprint, teams will develop initial Proof of Concept (PoC) prototypes that showcase blockchain-enabled land registry solutions. These prototypes will serve as early-stage artifacts for evaluation and dialogue with key stakeholders, including the National Land Commission Secretariat (NLCS).

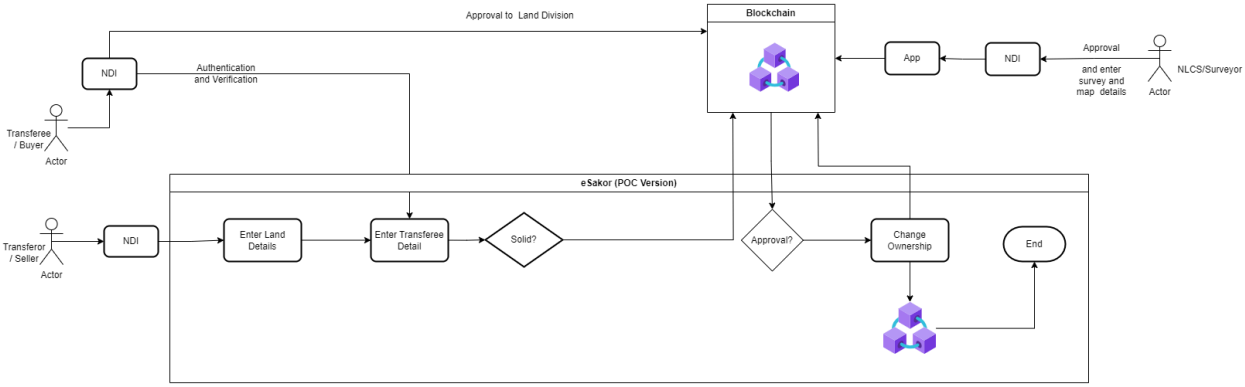
4.1. Sale and Purchase of Land between buyer and seller (single ownership)



4.2. Sale and Purchase of Land between buyer and seller: the land has joint-ownership



4.3. Sale and Purchase of Land between buyer and seller, however, only a portion of the land is sold (fragmented land)



Phase II: Following Phase I, two teams will be shortlisted based on the originality, technical robustness, and contextual relevance of their PoC solutions. Given the greenfield nature of this domain, selecting two teams—rather than a single winner—ensures diversity in research approaches, encourages comparative experimentation, and reduces the risk associated with pursuing a single unproven path. Each selected team will receive R&D support to further develop and enhance their solutions over a one-month period. This next phase aims to deepen technical exploration, address real-world implementation challenges, and evaluate alignment with the broader digital land governance framework.

5. Problem statement

Despite the adoption of digital platforms for land conveyances in Bhutan, the land transaction process remains vulnerable, inefficient, and prone to fraud. One of the key challenges is the lack of a reliable system to verify the authenticity of manually submitted documents. This creates significant risks, including document forgery, unauthorized transactions, and identity misrepresentation, especially when buyers, sellers, or their representatives are not physically present.

A critical concern is the fraudulent representation in land sales, particularly involving deceased owners. In some cases, individuals exploit census-based rules to falsely claim authority, leaving rightful heirs unaware of the transaction—leading to disputes and legal complications.

Additionally, the system imposes a heavy administrative burden on users. Multiple in-person visits are still required for tasks such as document submission, identity verification, and payment confirmation. These inefficiencies increase transaction costs, cause delays, and result in user dissatisfaction, ultimately undermining the intended benefits of digital transformation.

This hackathon aims to address these pain points by reimagining land transactions with secure, transparent, and user-friendly blockchain technological solutions.

6. Participants & Eligibility

6.1. Target Participants for Hackathon

This hackathon is open to national vendors holding a valid business license.

6.2. Team Composition for Hackathon

Each team must comprise a minimum of 3 members and a maximum of 5 members, including the following roles:

- Blockchain Developer(s)/Fullstack Developer(s)/Developer(s)-(mandatory)
- Business Analyst/Project Manager/Product Manager-(optional)
- Designer (UX/UI Designer) - (optional)
- According to need of the team (optional)

*** *The team composition may include external hires if necessary, such as a Blockchain Developer.*

7. Evaluation

The proposed blockchain solutions will be evaluated based on the criteria established for the hackathon.

8. Expected Outcomes

8.1. From Phase I: After the Hackathon

This phase will involve participating IT firms in a basic implementation of their proposed blockchain solutions for the identified problem statements. And following are the expected outcomes:

- Develop a Proof of Concept (POC) leveraging blockchain technology providing:
  - **Efficient Ownership Transfers:**
    Streamlined and automated land ownership transfers using blockchain-based smart contracts and escrow mechanisms, reducing reliance on intermediaries and manual processes.
  - **Increased Trust and Security:**
    Enhanced trust in land transactions by leveraging the transparency, immutability, and security of blockchain technology.
  - **Fraud and Error Reduction:**
    Significant reduction in fraud, disputes, and human errors in land record management through the use of non-fungible tokens (NFTs) representing unique land titles and immutable records.
  - **Transparent Land Registry System:**
    Creation of a transparent, tamper-proof, and verifiable land registry system accessible to all stakeholders, including the National Land Commission, buyers, and sellers.
  - **Improved Accountability and Traceability:**
    Each transaction and update to land records will be logged and time-stamped on the blockchain, allowing full traceability and auditability.
  - **Empowerment of Stakeholders:**
    Increased confidence for landowners, buyers, and investors through secure and verifiable digital ownership, ultimately contributing to economic development and land governance reform.

8.2. Phase II: After the Post-Hackathon

The two winners of the hackathon will refine the Proof of Concept (POC) prototype delivered during Phase I and develop more comprehensive and functional prototypes of their solutions, with additional requirements which will also include integration of National digital Identity (NDI) for identification .

9. R&D and Solution Refinement Support

Following Phase I, two teams will be shortlisted based on the originality, technical rigor, and contextual relevance of their PoC solutions. Given the greenfield nature of this domain, selecting two teams rather than one allows for diversity in research direction, encourages comparative experimentation, and mitigates the risk of pursuing a single, unproven approach. Each team will receive an **R&D support of Nu. 300,000** to refine and enhance their solution over a one-month period. This phase is designed to deepen technical exploration, address practical implementation challenges, and assess alignment with the broader digital land governance framework. However, should one of the two shortlisted teams from Phase I successfully demonstrate the viability of their solution to the NLCS and GovTech at the end of the one-month refinement period, their involvement in the broader re-engineering initiative will be considered based on the outcomes of the final presentation.

10. Roles & Responsibilities

10.1. GovTech – Lead Implementing Agency

As the primary implementing agency, **GovTech** will take the lead in coordinating all aspects of the hackathon and Proof of Concept (PoC) implementation. Their key responsibilities include:

10.1.1. **Overall Coordination and Planning:**
Oversee the design, execution, and monitoring of all activities related to the hackathon and PoC phases. This includes managing timelines, aligning stakeholder inputs, and ensuring smooth execution of the program.

10.1.2. **Financial Management:**
Handle budgeting, resource allocation, and financial oversight.

10.1.3. **Venue and Logistics Management:**
Organize all logistical aspects of the hackathon and associated events, including venue arrangement, equipment setup, catering, and technical support.

10.2. Participating IT Firm

10.2.1. Understand the Problem Statement
10.2.2. Develop a Proof of Concept (PoC)
10.2.3. Deliver Clear Documentation & Demo
10.2.4. Refine Prototype (if selected)

10.3. Mentors

10.3.1. GovTech, NLCS, and other relevant Technical Advisors collaboratively work together to guide participating teams throughout the hackathon, offering feedback relevant to the problem statement.
10.3.2. Guide the participating team.
10.3.3. Provide advice for the hackathon-participating team.
10.3.4. Review participants' ideas and prototypes during the hackathon.

11. Communication and Reporting

- The winning team will report directly to the Govtech-Emerging Tech Division focal & relevant Govtech official , and also Domain focal(NLCS for necessary update).
- Regular updates and progress reports of phase II will be required to ensure alignment with hackathon goals and timely delivery of objectives.
- Failure to submit final detailed documentation of the solution(after refinement period) will result in the winning team from not being able to participate in any other similar assignments for the period of 2 years.