Snapshot of Impact: A Concise Overview of Our Grant Application

We aim to improve the security of the LIDO ecosystem by providing validator security monitoring tools powered by AI. We have already carried out a research project supported by the Ethereum Foundation to build Tikuna, a security monitoring system for Ethereum's P2P network. We plan to expand Tikuna to include different clients and enhance the privacy and practicality of collecting validator data.

Creators: Unveiling the Minds Behind the Proposal

a. Dr. Andres Gomez Ramirez serves as the CEO of Sakundi [1], an organization dedicated to security and privacy research for blockchain networks. He has a Ph.D. in cybersecurity from the University of Frankfurt and CERN. As a computer scientist with a deep understanding of information security, machine learning, and computing infrastructure setup, he is responsible for providing technical and scientific leadership for the project. His role encompasses leading research activities and overseeing the design and development of our organization's products.

b. Loui Al Sardy, Co-Founder of Sakundi, holds an M.Eng. in Software Engineering for Industrial Applications and is currently pursuing a Ph.D. at the School of Engineering at Erlangen-Nuremberg University (Germany). With a strong background as a test engineer at a software development company, Loui has acquired valuable experience over the past seven years. Additionally, Loui has

conducted research studies on "Intelligent Evolutionary Constraint-based Testing Approaches for Software Vulnerabilities Discovery." Based-on his experience and knowledge, Loui currently fulfills the role of COO at Sakundi.

c. Francis Gomez Ramirez, also Co-Founder of Sakundi, is a computer scientist who obtained his degree from the Universidad Nacional of Colombia and has expertise in Project Management from UNITEC University. With a 12-year tenure at Grupo Bancolombia, Francis has demonstrated exceptional proficiency in managing infrastructure and suppliers. Notably, he has led groundbreaking AWS cloud

migration processes and has successfully implemented infrastructure automation using pipelines in Azure DevOps. These accomplishments reflect Francis's technical prowess and exceptional problem-solving abilities. Due to these skills and experience, Francis is CTO at Sakundi. He is in charge of ensuring that technology is aligned with Sakundi's business objectives.

Empowering LIDO: Unveiling the Crucial Role of Our Proposal in Ecosystem Growth

Introducing Tikuna 2.0, built upon the foundation of Tikuna [2], a security monitoring system for the Ethereum blockchain network funded by the Ethereum Foundation [3]. This implementation within the LIDO ecosystem will strengthen and enhance its overall security.

Tikuna utilizes an innovative approach based on the unsupervised Long Short-Term Memory (LSTM) model based-on Recurrent Neural Networks (RNNs) to detect various P2P security attacks effectively. Unlike Balval, the consensus layer validators monitoring bot does not focus on security or the P2P layer [4]. Through empirical testing, we have observed significant improvements in detection performance, achieving high accuracy in identifying and classifying attacks such as Eclipse attacks, Covert Flash attacks, and other threats targeting the Ethereum blockchain's P2P network layer.

In addition to the detection capabilities, we have also developed the initial version of security dashboards for the community, offering valuable information about node behavior and status. These dashboards will be a valuable resource for the LIDO ecosystem and its participants. With the grant, our objective is to expand Tikuna's capabilities further. We aim to identify additional types of attacks, minimize false positives, and enhance its ability to detect real-world incidents.

Our ultimate goal is to contribute to the reliability and security of the LIDO ecosystem by continuously developing and enhancing the Tikuna solution based on validated use cases with our partner Edenia [5]. While we are currently focused on implementing it within the Ethereum network, we anticipate extending its functionalities to other networks, such as Polygon and Solana, ensuring a broader reach and impact.

Timeline and Thrift: Navigating Project Details, Timelines, and Expense Estimates

Please include a brief explanation on the milestones/roadmap, along with expected deliverables. Also outline how the funds will be used for the project and or members of the team.

1. Investigate the state of the art in privacy-preserving technologies relevant to security monitoring systems. Duration: 5 days. Allocation: 10% of the budget.

2. Conduct in-depth research to enhance privacy-preserving techniques tailored to the monitoring of validator nodes, reinforcing confidence in our tool's capacity to secure sensitive data. Duration: 10 days. Allocation: 20% of the budget.

3. Implement a proof-of-concept based on the research findings for the Tikuna project. Furthermore, optimize the data collection methods to ensure practicality and user-friendliness for validators, thus driving wider adoption. Duration: 30 days. Allocation: 60% of the budget.

4. Write a report detailing the outcomes of the project. Duration: 5 days. Allocation: 10% of the budget.

Project Start Date: 01-Dec-2023

Project End Date: 13-Feb-2024

Total Days: 75

Work Days: 50

Budget

Principle Researchers Costs:

- Andres Gomez Ramirez - Lead security researcher

Hourly rate: $45

Number of hours worked per person*: 200

Total: $9,000

- Loui Al Sardy - Security researcher and developer

Hourly rate: $40

Number of hours worked per person*: 200

Total: $8,000

- Francis Gomez Ramirez - Security researcher and developer

Hourly rate: $35

Number of hours worked per person*: 200

Total: $7,000

*Number of hours worked per person: 4H per day, 20H per week, during 2.5 months.

Operating expenses:

- Server infrastructure:

Total: $2,000

Grand Total: $26,000

References


1. sakundi. io
2. tikuna. io
3. blog.ethereum. org/2022/07/29/academic-grants-grantee-announce
4. github. com/lidofinance/ethereum-validators-monitoring
5. edenia. com/