

UNIVERSITY OF SOUTH FLORIDA

Major Research Area Paper Presentation

*Proof-of-Useful-Randomness: Mitigating the Energy Waste in Blockchain
Proof-of-Work*

by

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For the Ph.D. degree in Computer Science and Engineering

Proof-of-Work (PoW) is one of the fundamental and widely-used consensus algorithms in blockchains. In PoW, nodes compete to receive the mining reward by trying to be the first to solve a puzzle. Despite its fairness and wide-availability, traditional PoW incurs extreme computational and energy waste over the blockchain. This waste is considered to be one of the biggest problems in PoW-based blockchains and cryptocurrencies. In this work, we propose a new useful PoW that mitigates the energy waste by incorporating pre-computed (disclosable) randomness into the PoW. The key idea is to inject special randomness into puzzles via (one-way) algebraic commitments that can be stored and later publicly disclosed. Unlike the traditional PoW which is wasteful, our approach enables pre-computed commitments to be utilized by a vast array of public-key cryptography methods that require offline-online processing (e.g., digital signature, key exchange, zero-knowledge protocol). Moreover, our PoW preserves the desirable properties of the traditional PoW and therefore does not require a substantial alteration in the underlying protocol. We formally proved the security of our PoW, and then fully implemented it to validate its significant energy-saving capabilities. We will also talk about our performance analysis of the Trace- Σ protocol which leverages accumulator schemes used in Blockchain settings.

Friday, November 20, 2020

4:00pm

Online, [Microsoft Teams](#)

Please email efe3@usf.edu for more information

THE PUBLIC IS INVITED

Examining Committee

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