Open platform for Tron blockchain forensics

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Excel@FIT 2025

Motivation

While Ethereum benefits from a mature ecosystem of analytics tools, Tron, despite high activity and low fees, still lacks a transparent, open-source blockchain explorer. **This thesis fills that gap by extending the modular Blockbook platform to support Tron, enabling public access to transaction data and forensic insights.**

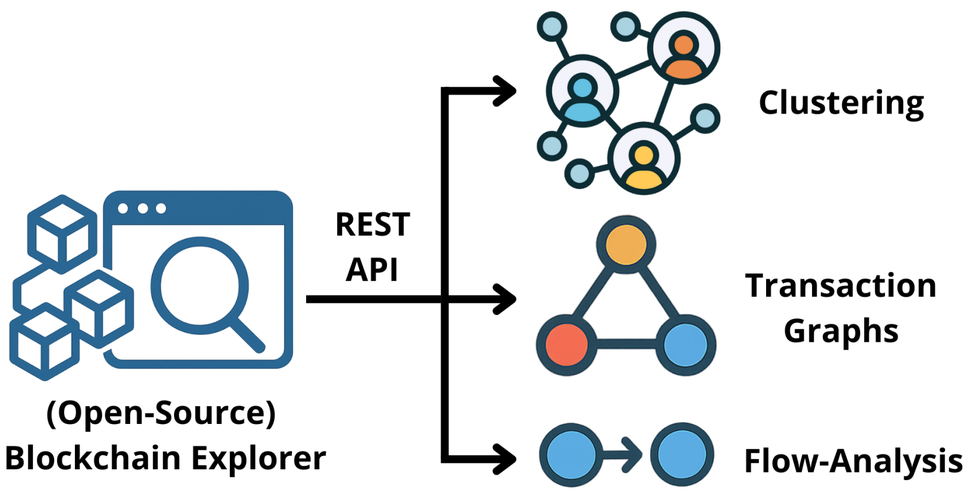

Figure 1. Blockchain explorer role in forensics

Goals

- Analyze Tron blockchain, its architecture and technical implementation.
- Provide a comprehensive comparison with Ethereum.
- Design and implement a Tron-compatible blockchain explorer using Blockbook.
- Develop forensic functions such as address attribution.

Tron VS Ethereum - Architectural Differences

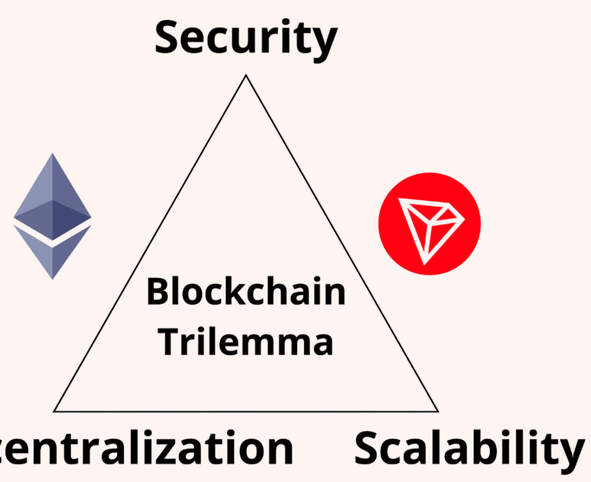

Figure 2. Comparison of Ethereum and Tron In Blockchain Trilemma

Feature	Ethereum	Tron
Market Cap Position	#2	#10
Consensus Mechanism	Proof of Stake (PoS)	Delegated PoS (DPoS)
Block Time	12 seconds	3 seconds
Transactions per Second (TPS)	Avg: 17 TPS Max: 62 TPS	Avg: 109 TPS Max: 272 TPS
Transaction Fee Model	Gas fees paid in ETH	Daily quota of free transactions
Finality	6-12 Minutes	1 Minute
Governance	Off-Chain (EIPs)	On-chain/Off-Chain
Virtual Machine	EVM	TVM; EVM extended by Tron-specific features
Address Format	Hex (0x...) 20 bytes, EIP-55 checksum	Base58Check (T...), 21-byte format
Governance	Off-Chain (EIPs)	On-chain/Off-Chain

Table 1. Essential differences between Ethereum and Tron

Blockbook Design

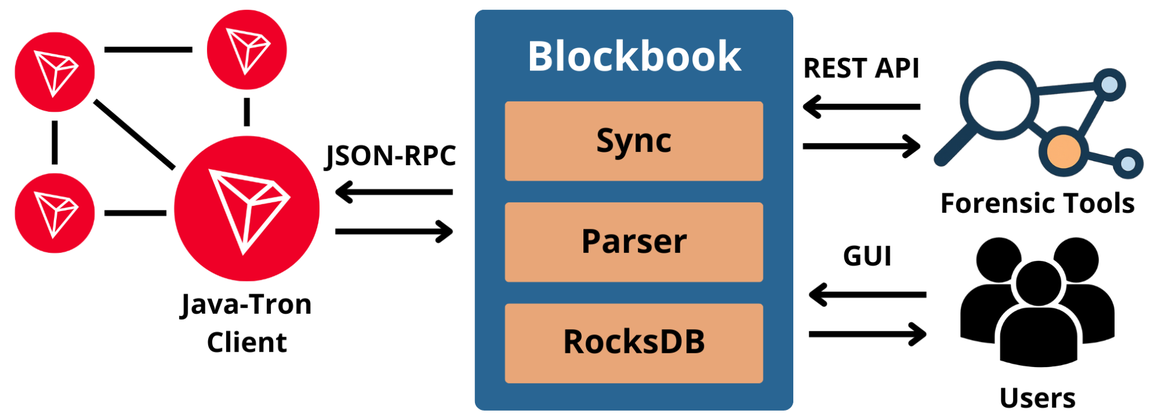

Figure 3. Top-view on Blockbook Design

Implementing Tron Support into Blockbook

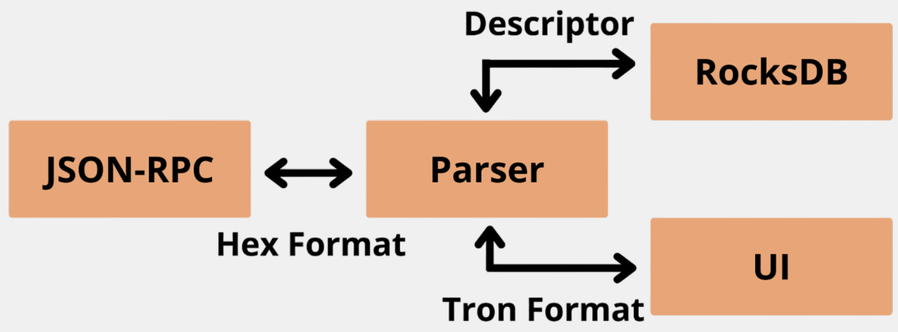

Figure 4. One of the main responsibilities of Tron parser

Extension of the Thesis - Address Attribution via Webscraping

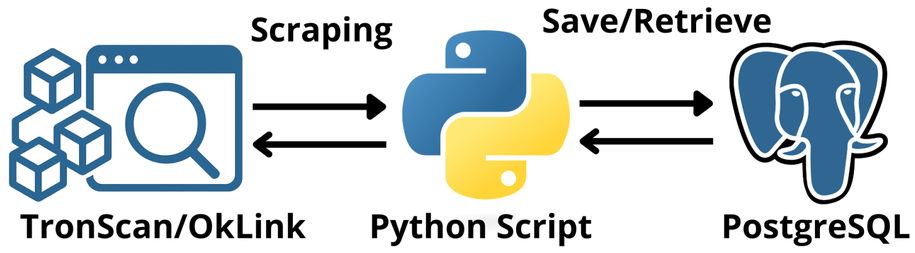

Figure 5. Flow of web-scraping address attributions

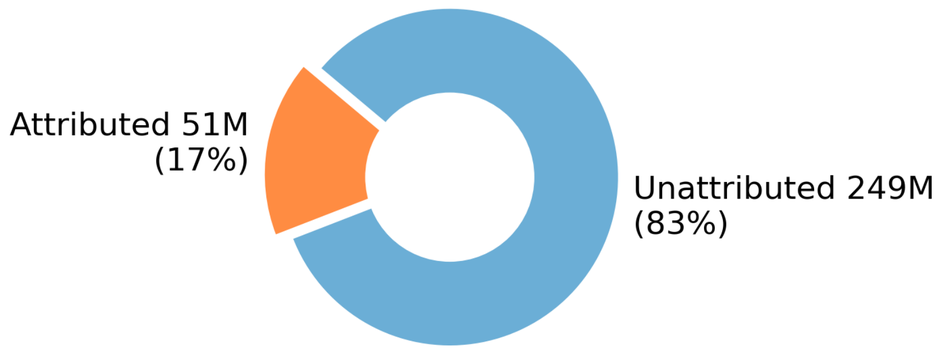

Figure 6. Graph of web-scraped address attributions

Results

- Unit and integration tests confirmed correct address conversion and data parsing.
- Tron support was successfully implemented into Blockbook.
- Address attributions are available within the GUI and REST API.
- Support of ERC-type smart contracts (TRC-20, TRC-721, TRC-1155).
- Webscraping yielded over 51M address attributions.
- Data integrity was validated with Tronscan blockchain explorer.

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