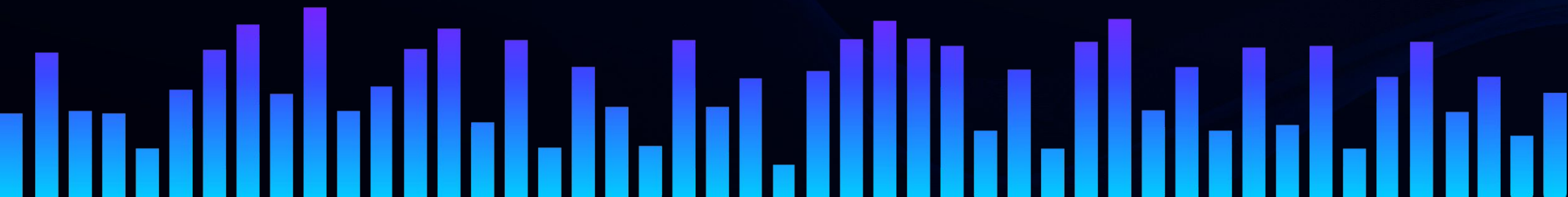
equalizer

Equalizer Academy
Lecture 1

January 2022



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Introduction

- The Equalizer project
- Equalizer team
- Participants introduction

How is the Equalizer Academy structured?

- Working Group model
- Open format
- Audience: anyone interested in DeFi and Blockchain
- Information and knowledge is shared via
  - https://github.com/Equalizer-Finance/academy
  - Discord channel for discussions
- Topics for the first lectures are pre-defined
- How to propose topics?

  (https://github.com/Equalizer-Finance/academy/blob/main/how-to-contribute.md)

What topics will we cover in the academy?

- Theoretical and hands-on workshops
- Blockchains and block processing
- EVM and Smart Contracts
- Flash Loans
- Arbitrage, Liquidation and Collateral swap
- Trading arbitrage strategies
- Trading automation or trading bots
- Topics **you** propose

Academy evolution

- Group formation and per-topic discussions
- Covering multiple fields (technical, business, devops, security, architecture, etc.)
- New working-group formations depending on the interest

Why to join the academy?

- Learn from the best in the field
- Hands-on workshops
- Networking
- Possibility to present your work, propose topics

Understanding Flash Loans

Understanding blockchain, blocks and transactions

- Blockchain is a software
  - Blockchain nodes
    - P2P communication
    - Mem-pools
    - Database
    - Transaction processing
    - EVM (or other EVM)
    - APIs (JSON-RPC, WS)
- Task: study go-ethereum
  - Code is well organised
  - Written in GO -> easy to read
  - Software is big, don’t lose patience :)

Transaction lifecycle

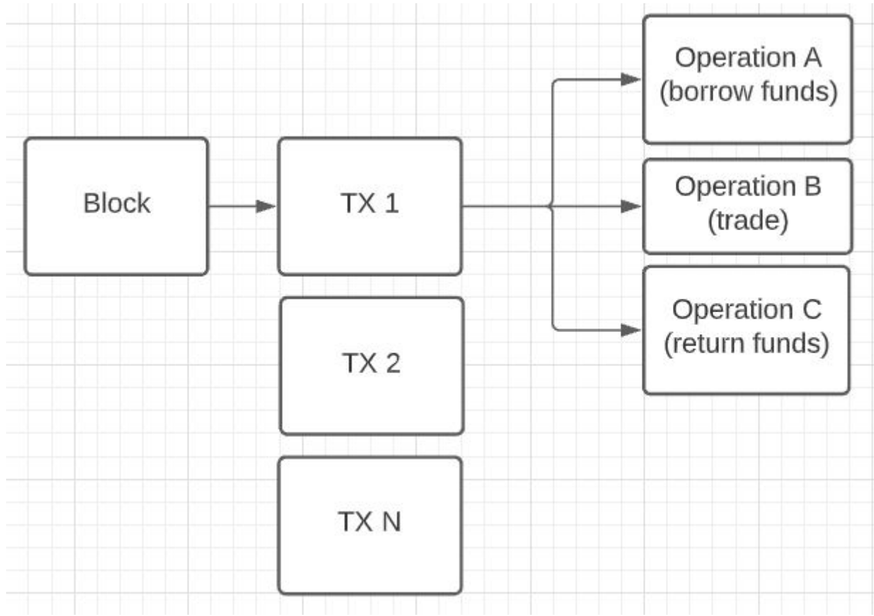
- Transaction
  - Digitally signed object
    - Transfer funds
    - Create a new smart contract
    - Invoke a smart contract method
- Etherscan (and other block explorers)
- Tx lifecycle
  - Create an unsigned tx
  - Sign the tx (wallet/metamask/…)
  - Submit the tx to the network
  - Tx goes to the mem-pool (advanced topics such as MEV will be covered later)
  - Tx is processed by “miners” and included into blocks
  - Block is broadcasted over the network and included into the blockchain
- Task: Find different types of transactions on etherscan and analyse what they do

What are smart contracts

- Smart contract is a software
- Ethereum SC are mostly written in Solidity
- Solidity is a compiled language
  - Write code
  - Compile the code (you get bytes)
  - Deploy the smart contract (compiled software is the “data” field in the TX)
  - Interact with the smart contract (data in the TX is serialised information on which method to call with what arguments)
- Smart contract, as any other software, enables to to perform multiple operations
  - For example: borrow funds, trade tokens, return funds

Atomic operations

- In blockchain, “time” is discrete
- Blocks, transactions, operations are processed sequentially
- Processing
  - State S
  - Apply TX_1 to S; S -> S+1
  - Apply TX_2 to S+1; S+1 -> S+2
  - …
  - Apply TX_N to S+N-1; S+N-1 -> S+N



Understanding flash loans

- Flash loan is a collection of operations executed by a smart contract
- Operations:
  - Borrow funds from Flash Loan providers (Equalizer)
  - Perform different trades on DEX-es, that result in arbitrage, liquidation, self-liquidation, …
  - Return funds + fee
  - If the funds and/or fee are not returned, the operation is **reverted** (gas fee is spent, blockchain state doesn’t change)
- Example: https://docs.equalizer.finance/getting-started/how-do-i-borrow-a-flash-loan

What Equalizer offers

- State-of-the art flash-loan platform (https://app.equalizer.finance/)
- Flash loans on:
  - Ethereum
  - Binance Smart Chain
  - Polygon
- Documentation and examples (https://docs.equalizer.finance/)
- Github: https://github.com/Equalizer-Finance/academy
- Community

What’s next?

- We learned
  - Basics of the transaction processing
  - Basics of Smart Contract processing
  - What are atomic operations
  - Why Flash Loans are possible
- Homework
  - Try to find flash loan transactions on block explorer
  - Analyse the flash loan transactions
  - Try to write and deploy smart contracts (https://docs.equalizer.finance/getting-started/how-do-i-borrow-a-flash-loan-a-deep-dive)
- Next lecture
  - Deep dive on smart contracts
  - Deep dive on flash loans

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