

Analysis of Market Manipulation on the Solana Blockchain with a Focus on Wash Trading

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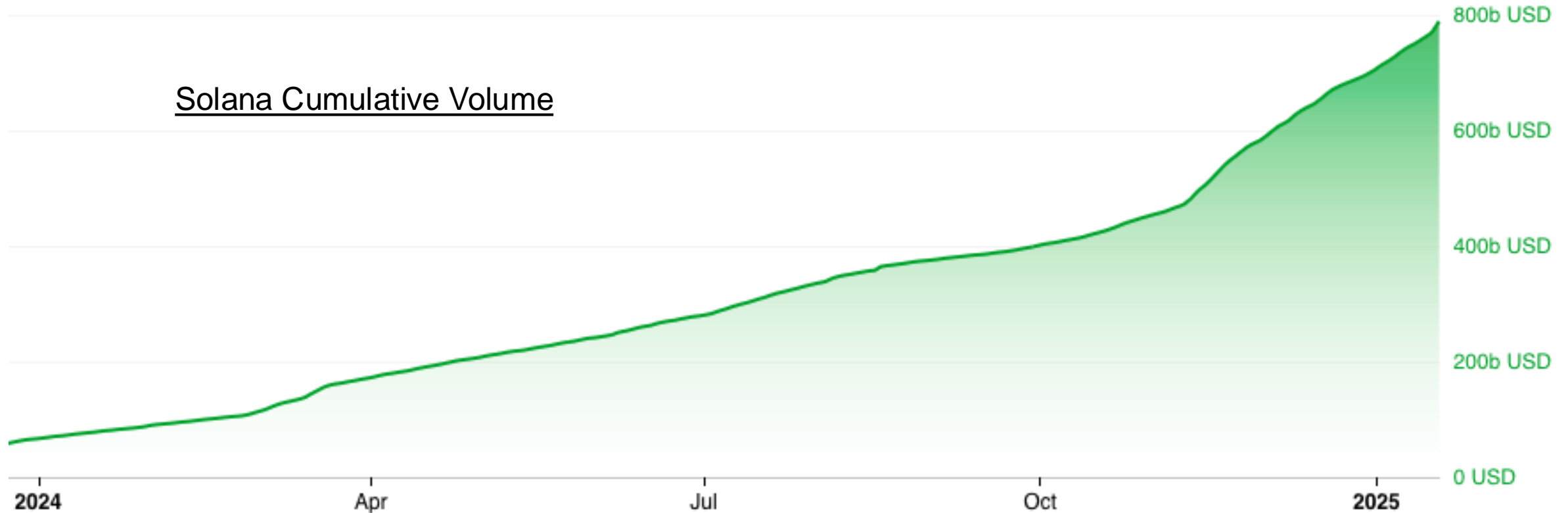
1. Background and Motivation
2. Problem Statement
3. Research Questions
4. Methodology
5. Progress
6. Timeline

Motivation



Motivation

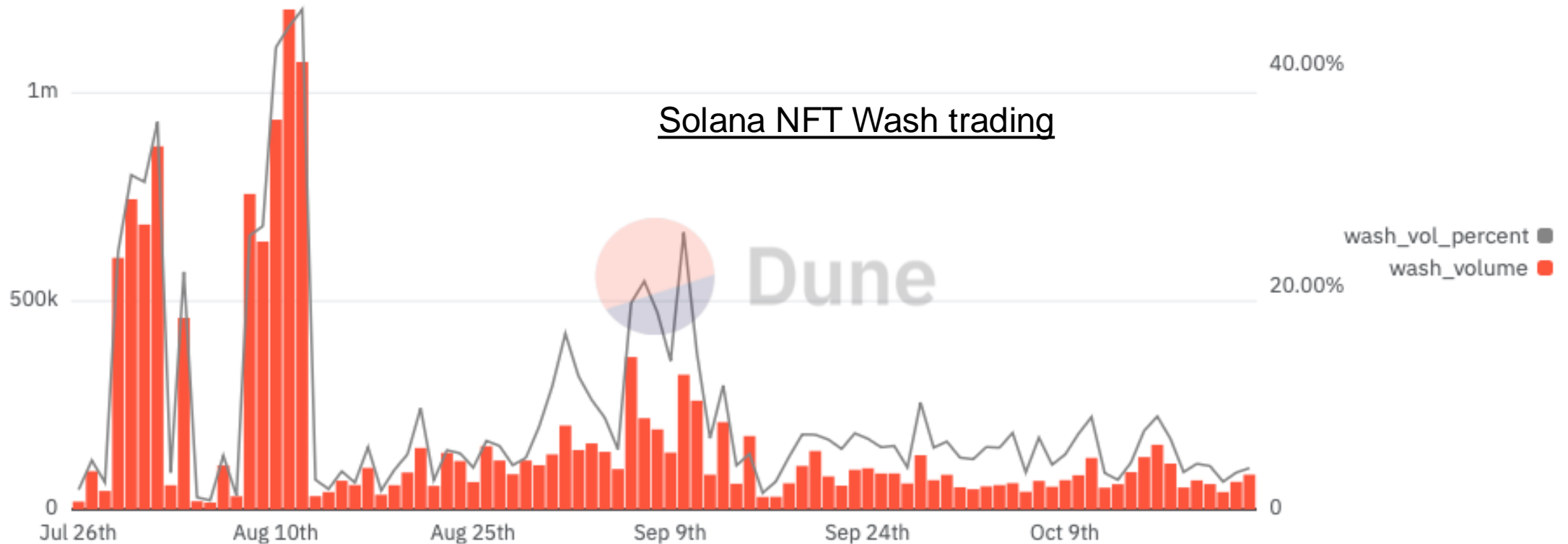
Why is Solana interesting?



- Solana's trading volume is experiencing significant growth.
- Compared to other blockchains, Solana stands out for its exceptional speed and minimal transaction costs.

Motivation

Why is Wash trading a problem?



- Trading volume includes wash trades.
- The chart above illustrates examples of NFT wash trades conducted on the Solana blockchain.
- Wash trades are transactions that artificially inflate volume without creating real value.

Motivation

What is the reason for wash trading on fungible tokens?

- Wash trading of fungible tokens (as shown on the right) is an under-researched area on the Solana blockchain.
- The primary incentive for wash trading coins is to artificially inflate their trading volume, making them appear more attractive.
- Example:
 - A creator launches a new coin on the Solana blockchain that lacks visibility.
 - To gain attention, they artificially boost the coin's trading volume, increasing its chances of being featured on exchange top trading lists.



Solana



Wrapped Ether



USDT



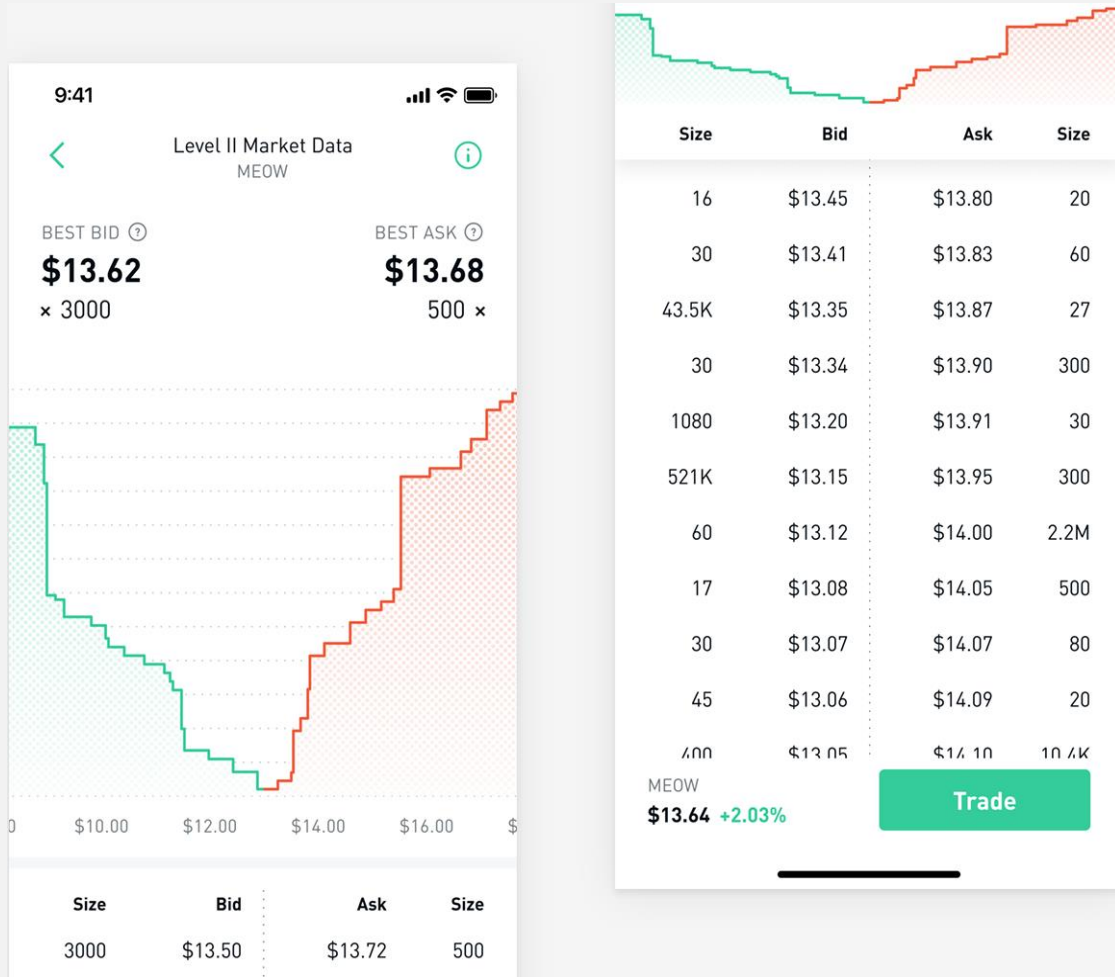
Jupiter



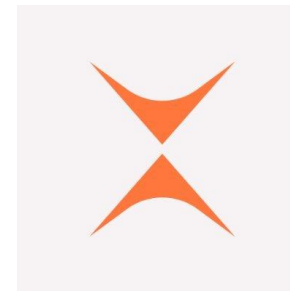
USDC

Decentralized Exchanges

Limit Order Exchange (Order book exchanges)



- A buyer places a bid to purchase an amount Y of an asset at a price X .
- A seller places an ask to sell an amount Z of the same asset at a price V .
- When a buyer and seller agree on a price, the asset is sold.
- A seller can also fulfill orders from multiple buyers, splitting the asset among them.



Phoenix



Raydium

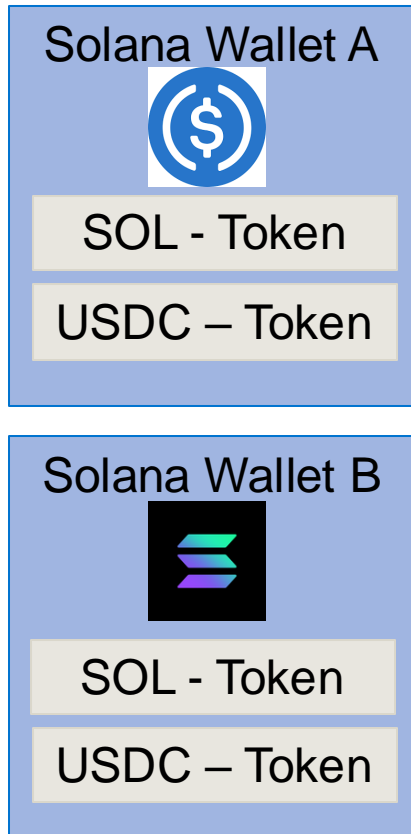


Orca

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Problem Statement

How is Wash trading done?



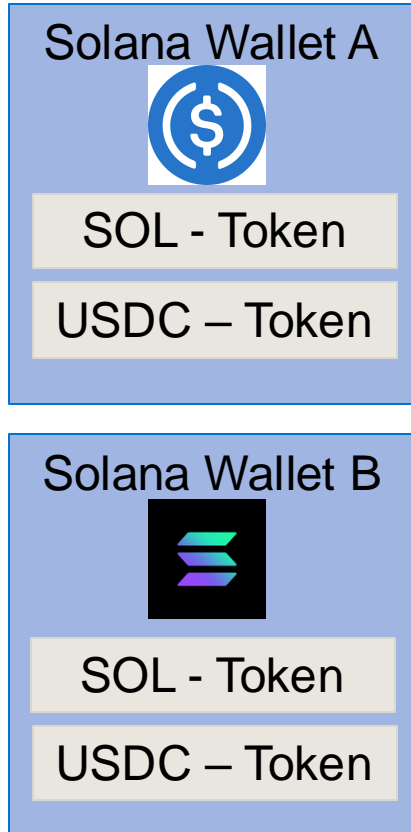
Wants to buy 0.04 SOL
at a price of 245.55 USDC
(10 USDC)

Limit Orderbook Exchange Smart Contract

BID SIZE SOL	PRICE USDC	ASK SIZE SOL
	264.515	20.140
	264.500	25.000
	264.100	25.000
	263.968	1,136.501
	263.750	25.000
	263.400	25.000
	263.050	25.000
	262.525	
0.200	262.000	
538.807	261.418	
19.600	260.890	
25.000	260.100	
43.360	260.014	
25.000	259.750	
25.000	259.400	

Problem Statement

How is Wash trading done?



Wants to sell 0.04 SOL
at a price of 245.55 USDC
(10 USDC)

Limit Orderbook Exchange Smart Contract		
BID SIZE SOL	PRICE USDC	ASK SIZE SOL
	264.515	20.140
	264.500	25.000
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Problem Statement

How is Wash trading done?

Alice




Sends 0.4 SOL

Sends 10 USDC


Limit Orderbook Exchange Smart Contract

BID SIZE SOL	PRICE USDC	ASK SIZE SOL
	264.515	20.140
	264.500	25.000
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Problem Statement

How is Wash trading done?



Limit Orderbook Exchange Smart Contract

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Problem Statement

How is Wash trading done?

Alice

Solana Wallet A

- SOL - Token
- USDC – Token

Solana Wallet B

- SOL - Token
- USDC – Token

Receives 0.4 SOL



Receives 10 USDC

Limit Orderbook Exchange Smart Contract


BID SIZE SOL	PRICE USDC	ASK SIZE SOL
	264.515	20.140
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Problem Statement

How is Wash trading done?


Alice


Solana Wallet A



SOL - Token

USDC – Token

Solana Wallet B



SOL - Token

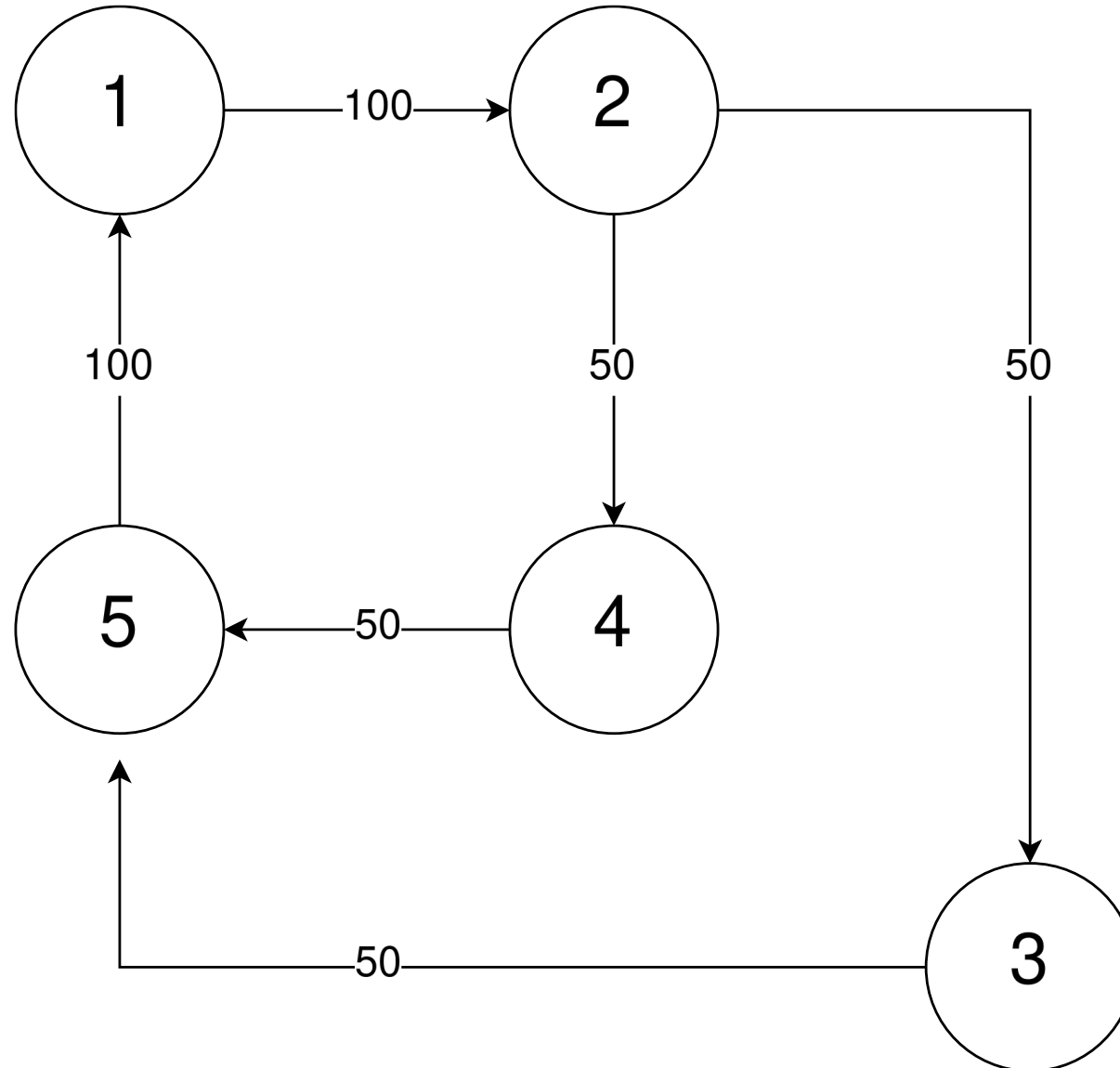
USDC – Token

Limit Orderbook Exchange Smart Contract

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Problem Statement

Complexity of Wash trading



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RQ 1: Assessment of current wash trading research on Solana

RQ 2: Development of a framework or a methodology to detect wash trades

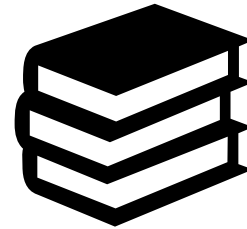
RQ 3: Quantification of wash trades on Solana

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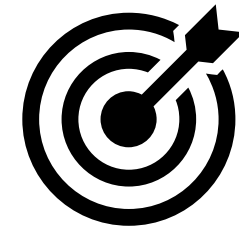
Data Collection and Cleaning

- Collect historical transaction information from RPC Endpoints.
- Clean, organize and structure the data.



Heuristics Determination

- Conduct Literature research.
- Develop a Heuristic for detecting wash trades systematically.



Evaluate Findings

- Track Wash trader patterns and similarities.
- Compare different exchanges.
- Compare different Tokens.

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- Got familiar with the Solana blockchain and its programming language, Rust.
- Researched the decentralized exchange (DEX) landscape.
- Established a pipeline for historical transactions of selected token pairs.
- Encountered challenges with Solana's massive amounts of data, much of which is not relevant, but resolved this or are currently working on a solution.
- Determined suitable token pairs for the analysis.
- Read into wash trading detection methods.

	Solana	Ethereum
Block size in Transactions	20000	70
Block time in Seconds	0.4	13
Transaction per Second	50000	20-30

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December & January

February

March and April

May and June

Data Collection

Research &
Heuristic
Implementation

Data Analysis

Writing the thesis

- Pull historic transactions of Solana exchanges.
- Figure out what exchanges provide needed data.

- Find a Definition of Wash trading.
- Learn how Wash trading is detected.
- Use different researched Heuristics for detecting wash trading.

- Compare findings with current state of research
- Visualize everything to make it more approachable

- Definitions and current state of research will be written simultaneously
- Proofreading and Correction in June



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Picture of Trump:

<https://www.tagesschau.de/wirtschaft/weltwirtschaft/iwf-wirtschaftswachstum-prognose-2025-trump-100.html>

Picture of Trump Coin:

https://gettrumpmemes.com/images/TrumpCard_EnjoyMySneakers_Signiture-680_1.webp

Market Cap Trump Coin:

<https://coinmarketcap.com/currencies/official-trump/>

Volume Solana:

<https://defillama.com/chain/Solana?groupBy=cumulative¤cy=USD&volume=true&tlv=false>

Solana NFT washtrade:

<https://dune.com/tianjinfan/solana-nft-wash-trading>

Orderbook:

<https://www.investopedia.com/terms/o/order-book.asp>

Orderbook 2:

<https://app.phoenix.trade>

Ethereum vs. Solana:

<https://cryptomus.com/blog/ethereum-vs-solana-a-complete-comparison>