Chain-Abstracted Async Apps

Adair Kelley - ETH Denver 2025

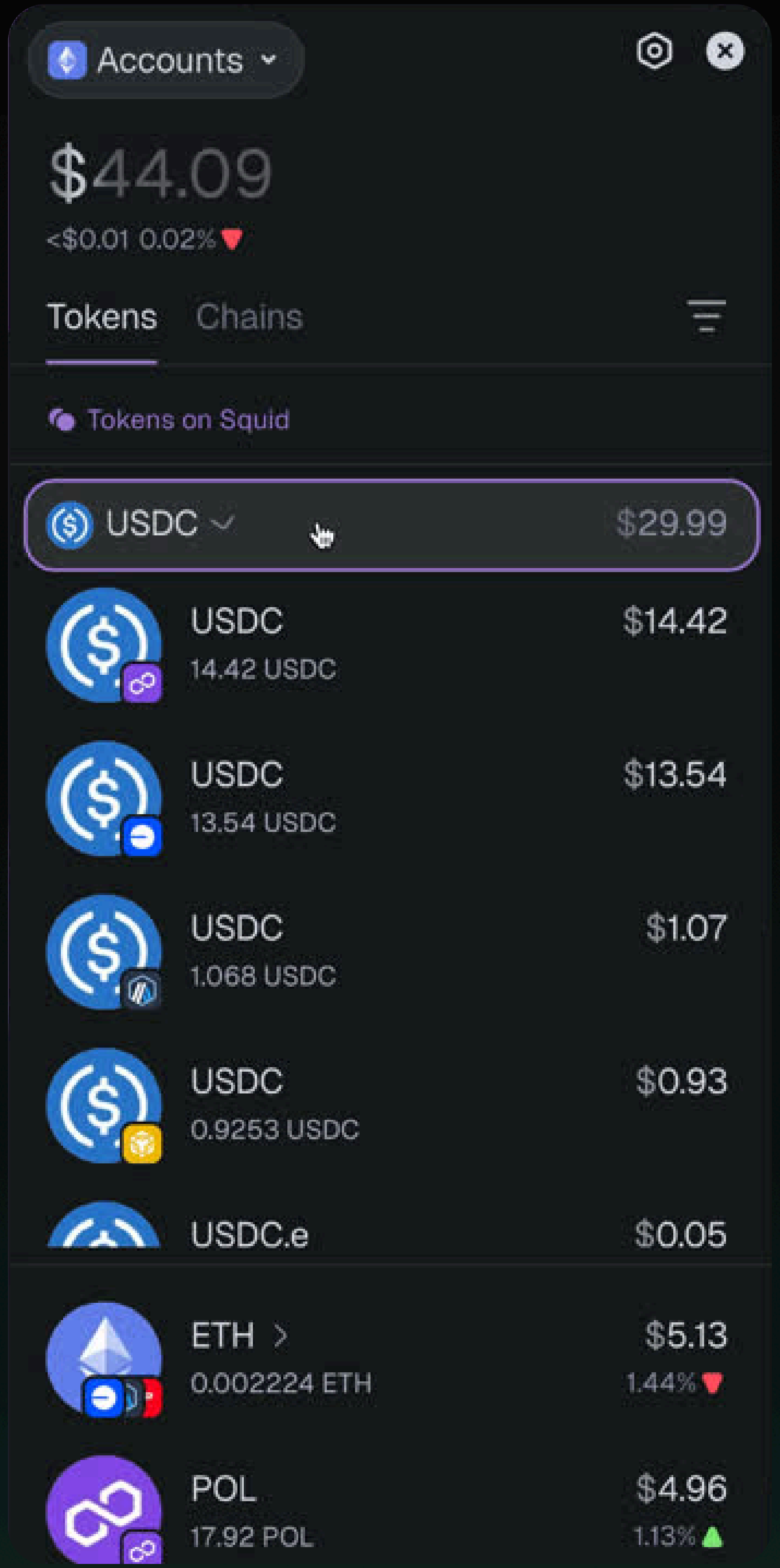
ABSTRACT

PROBLEM

Chain abstraction

Unified Capabilities:

- ✓ Balances
- ✓ Transfers
- ✓ Swaps



Accounts

$44.09

<$0.01 0.02%

Tokens Chains

Tokens on Squid

USDC	$29.99
USDC 14.42 USDC	$14.42
USDC 13.54 USDC	$13.54
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USDC 0.9253 USDC	$0.93
USDC.e	$0.05
ETH 0.002224 ETH	$5.13 1.44%
POL 17.92 POL	$4.96 1.13%

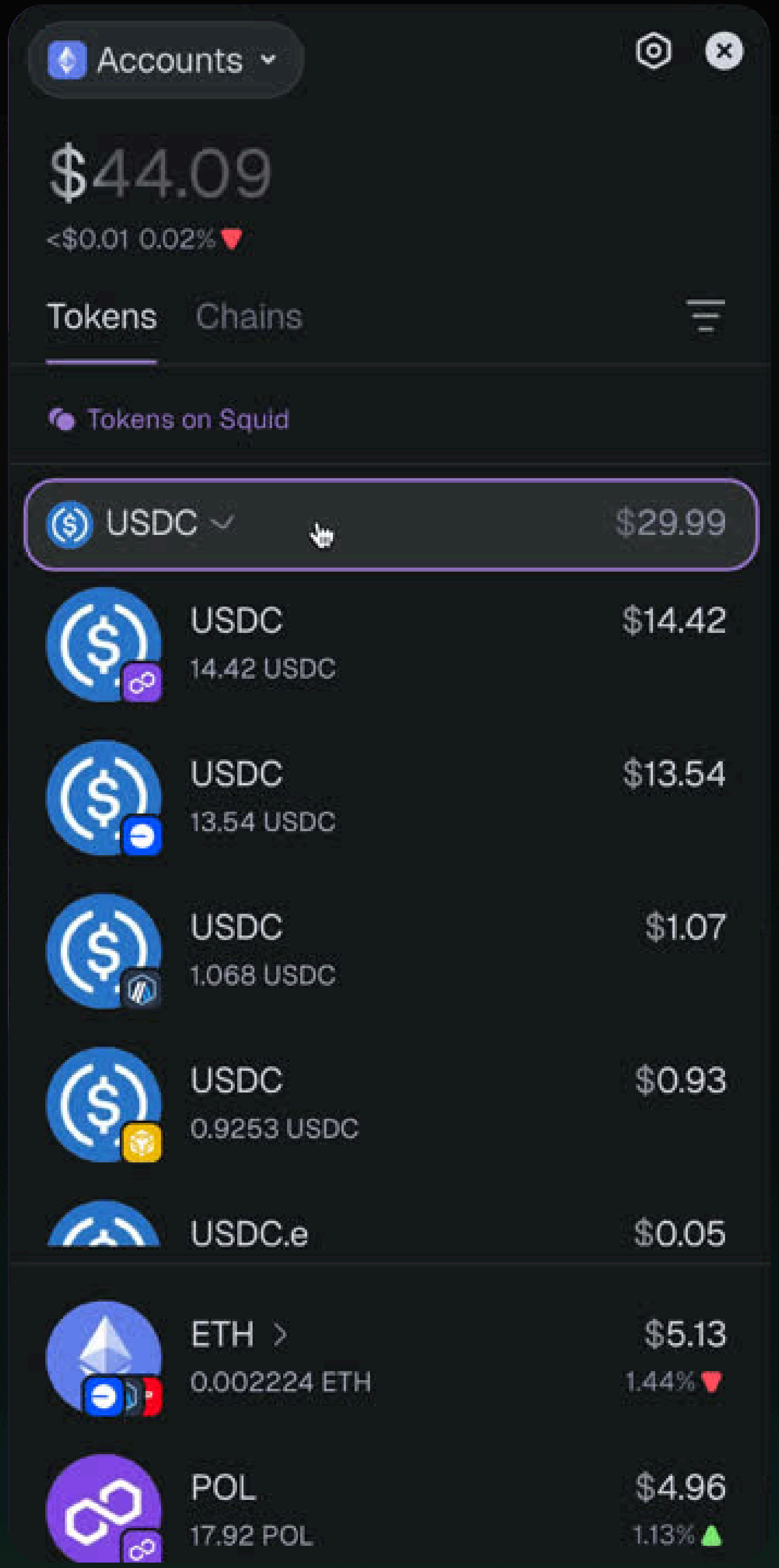
PROBLEM Chain abstraction is an illusion

Unified Capabilities:

- ✓ Balances
- ✓ Transfers
- ✓ Swaps

Limitations

- ✗ Cross-chain protocols
- ✗ Fragmented liquidity
- ✗ Centralized execution



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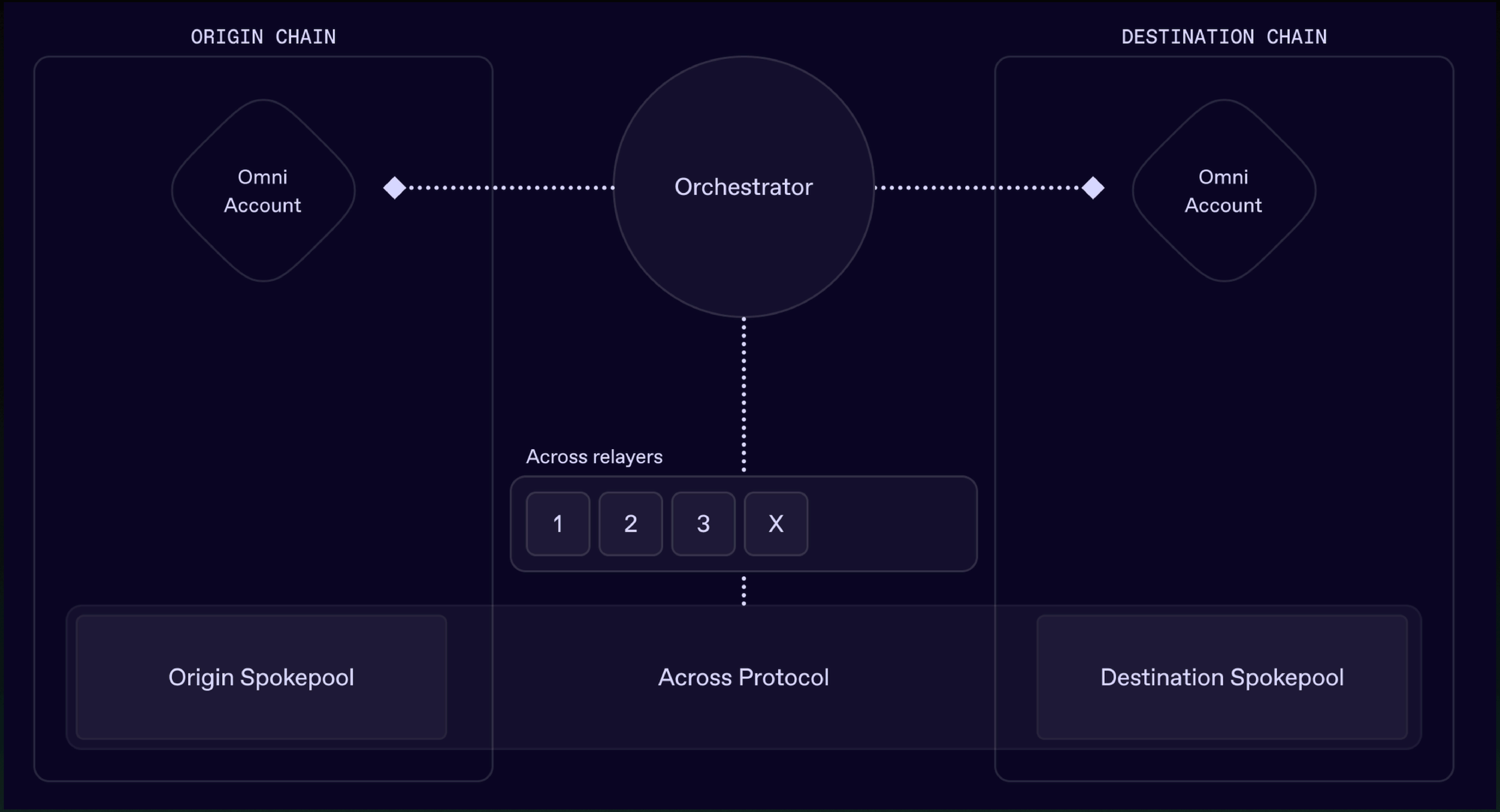
ABSTRACTION

How does chain abstraction work?



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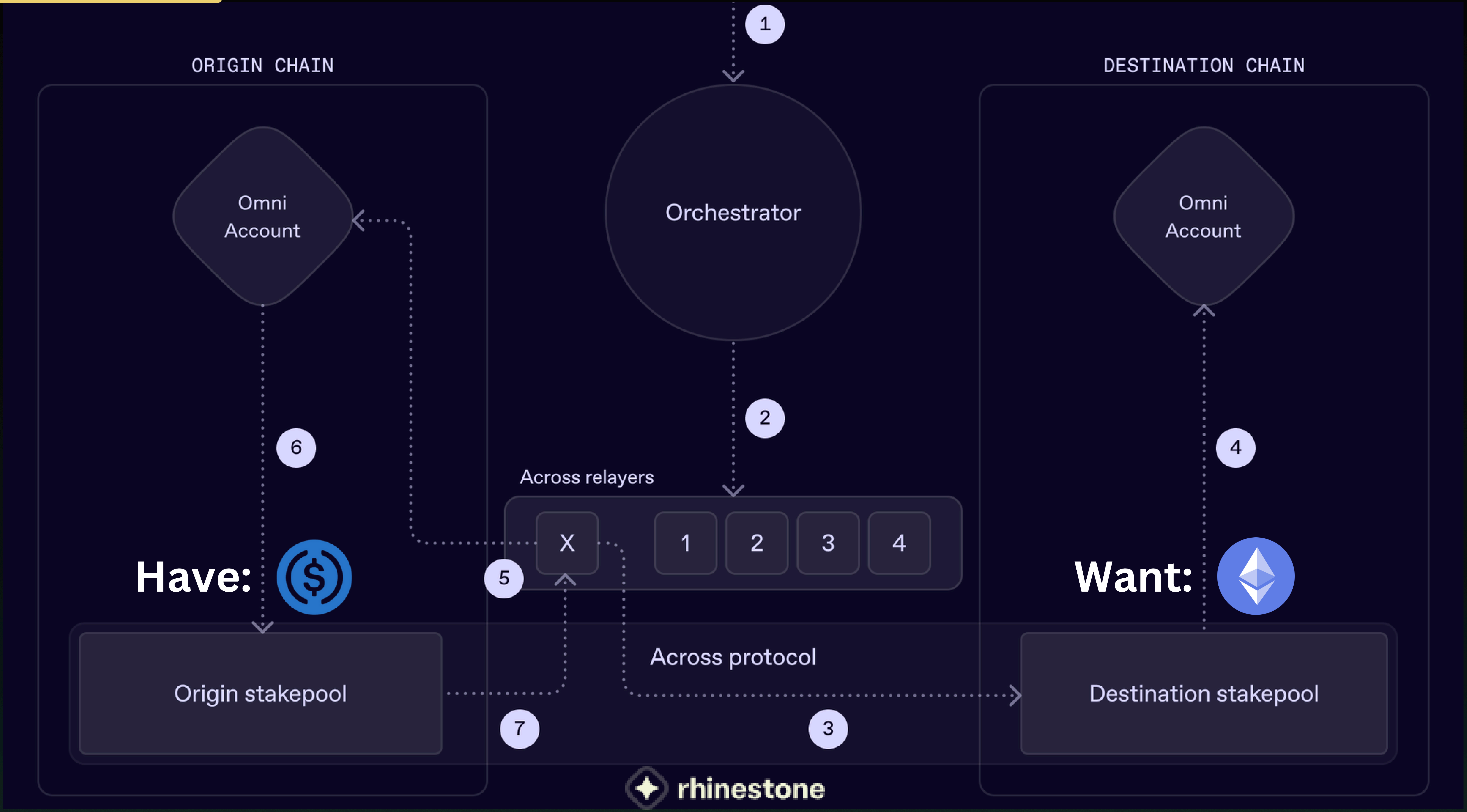
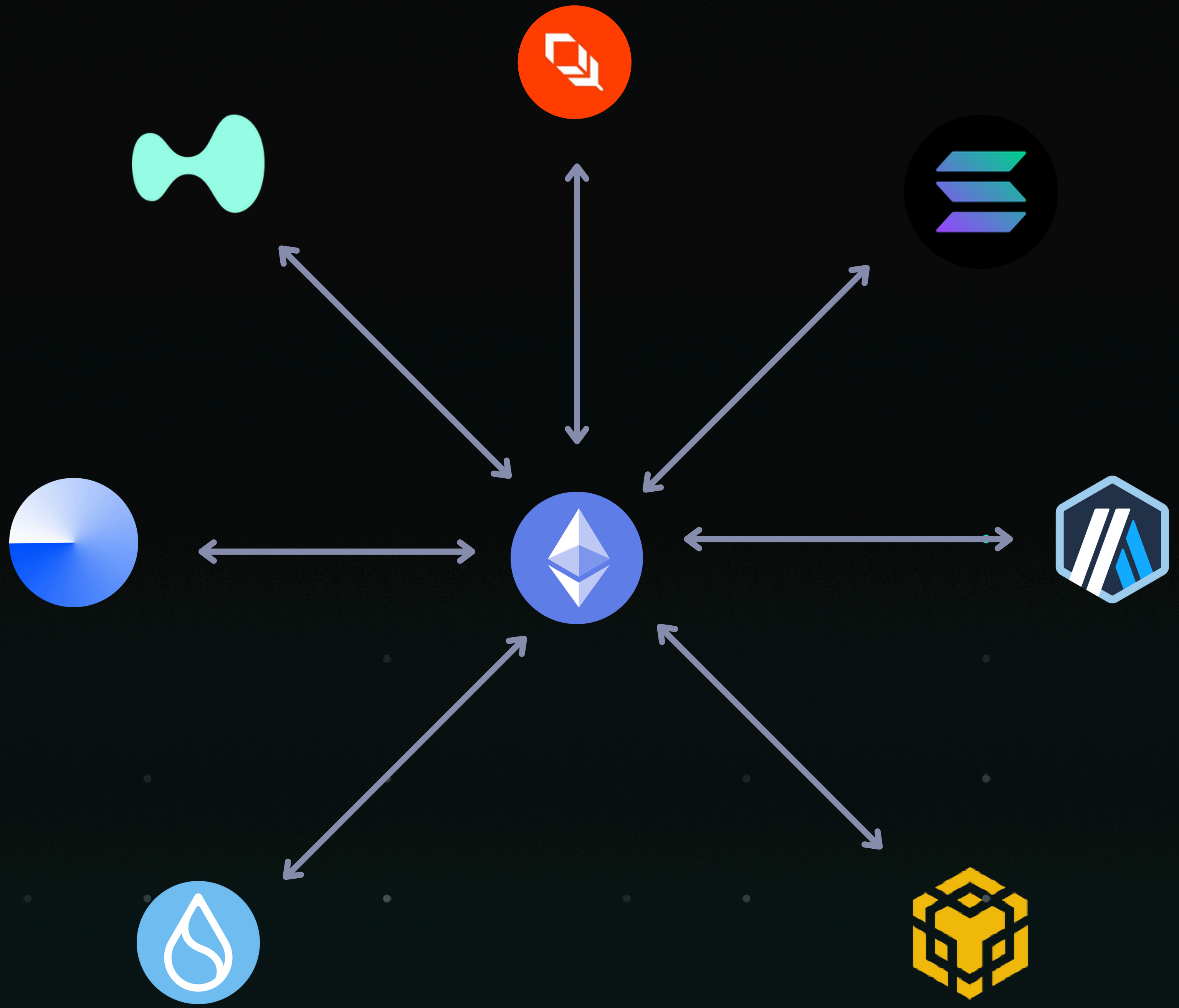


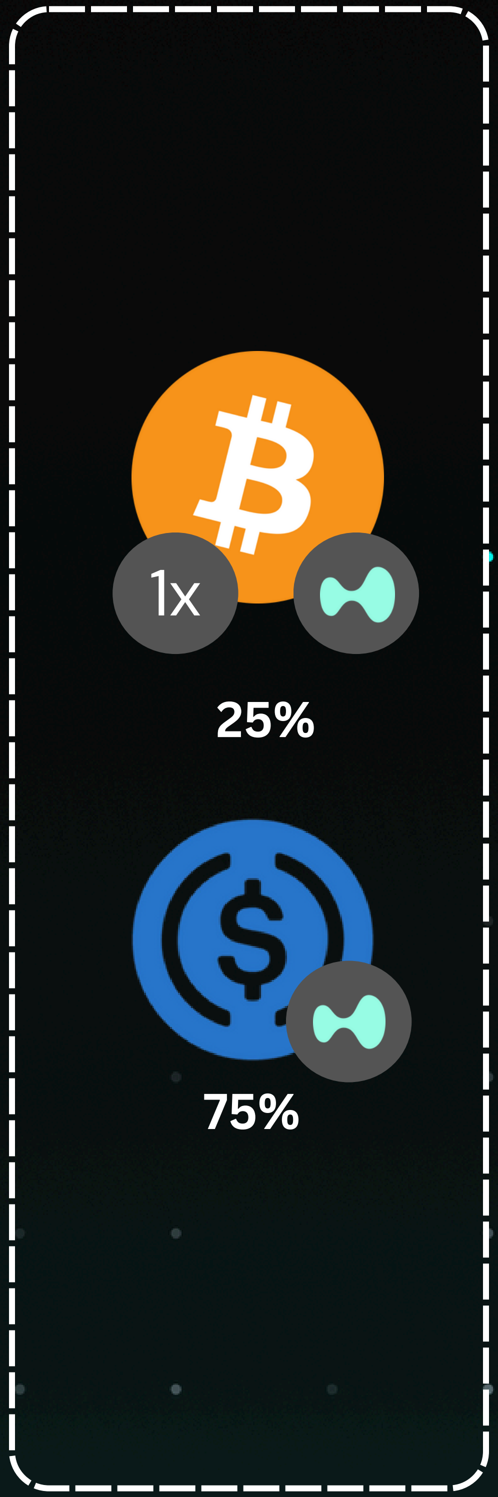
ABSTRACTION When does the illusion fall apart?

- Yield aggregators
- Cross-chain lending
- Governance
- Investment strategies
- ... many more



CASE STUDY

Let's build a trend-following BTC Vault



Leveraged BTC (perps) position

Core collateral

trendBTC = [-1, 1] x BTC

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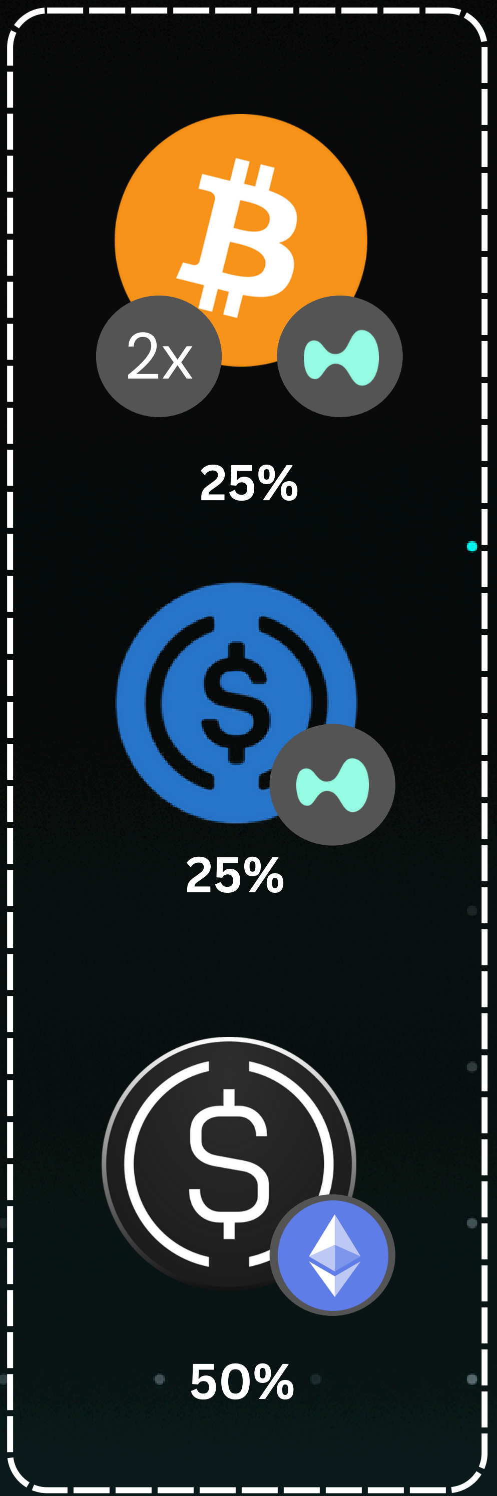


Leveraged BTC (perps) position

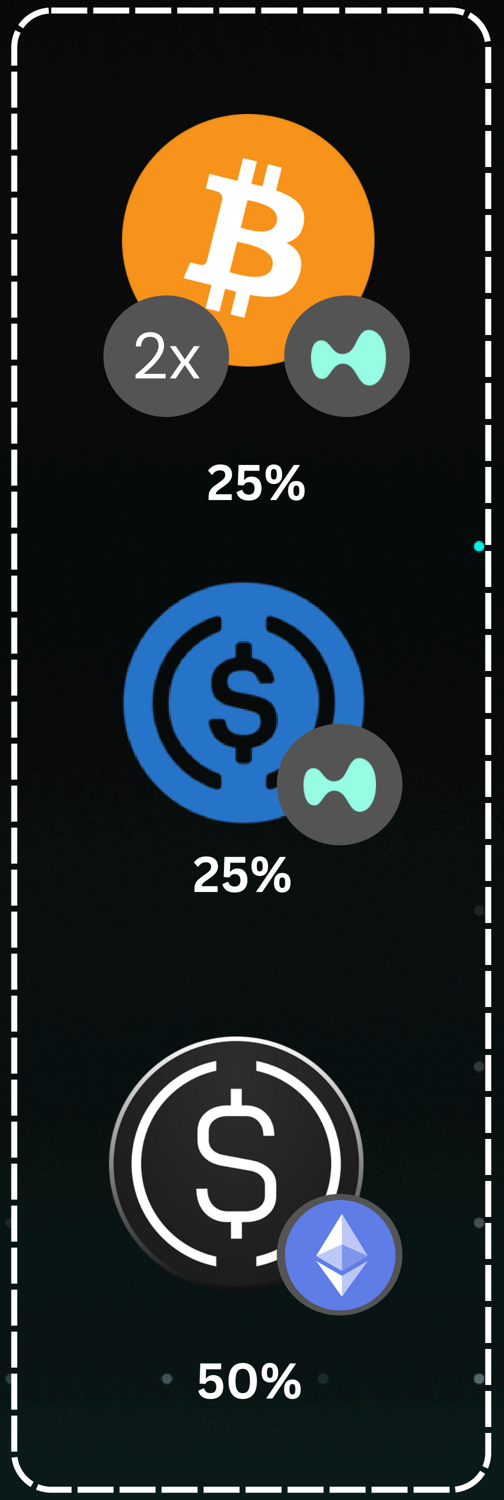
Core collateral

Excess collateral (yield-bearing)

trendBTC = [-1, 1] x BTC

CASE STUDY

TrendBTC Vault – requirements



trendBTC

Our vault needs to:

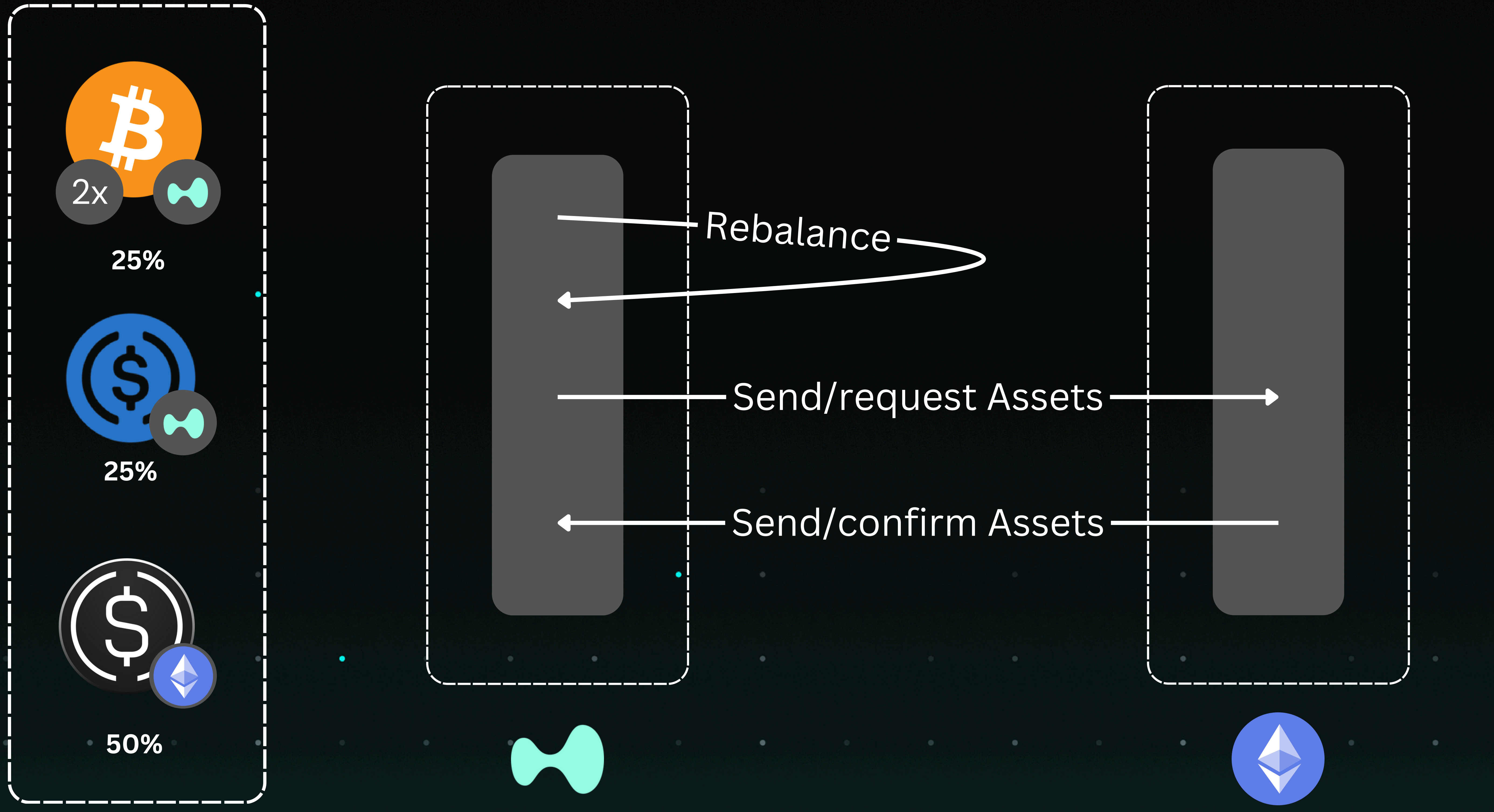
1. Rebalance assets

2. Calculate share values

3. Process shares

...these are all async!

TREND_BTC What does a cross-chain rebalance look like?



trendBTC

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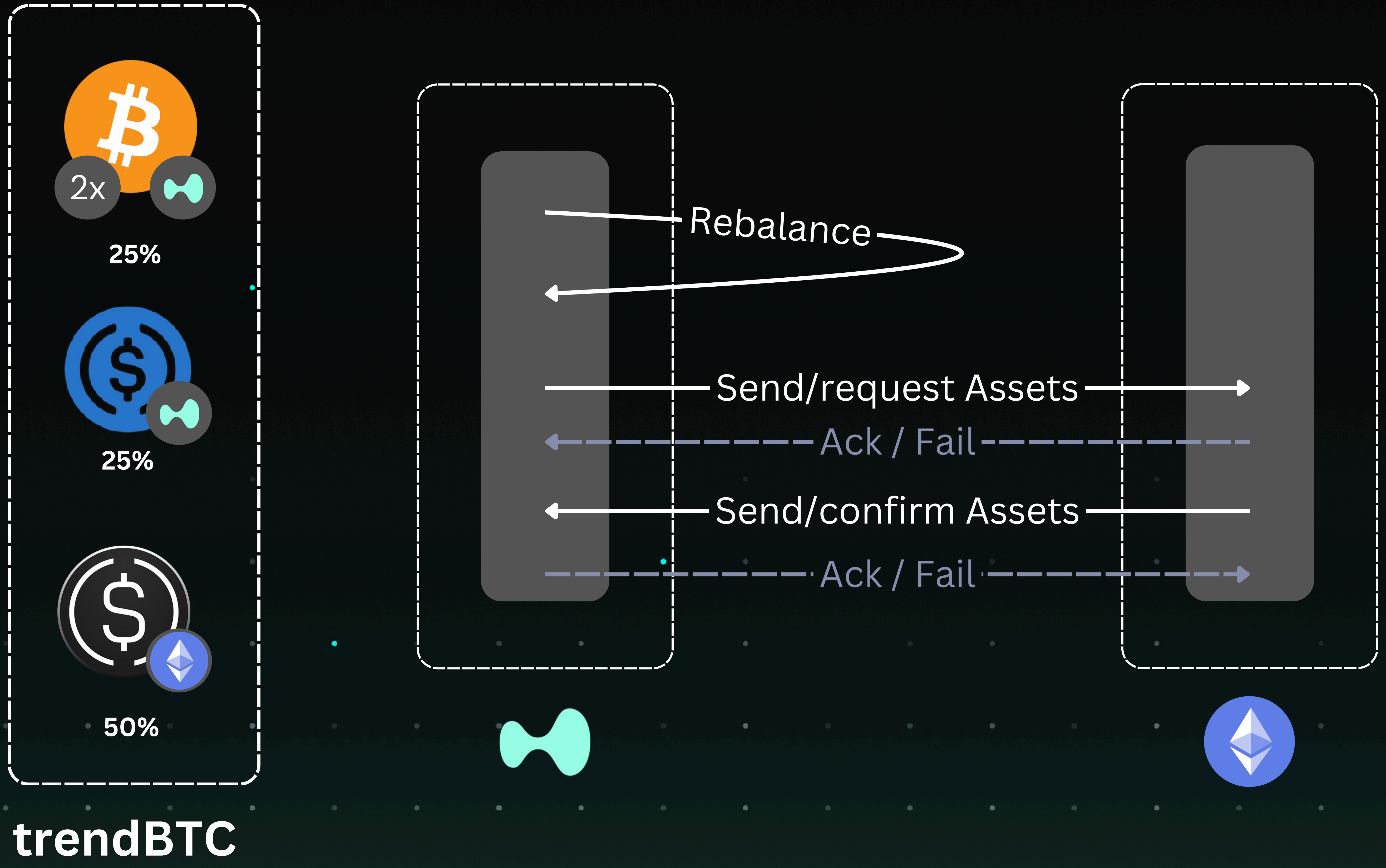
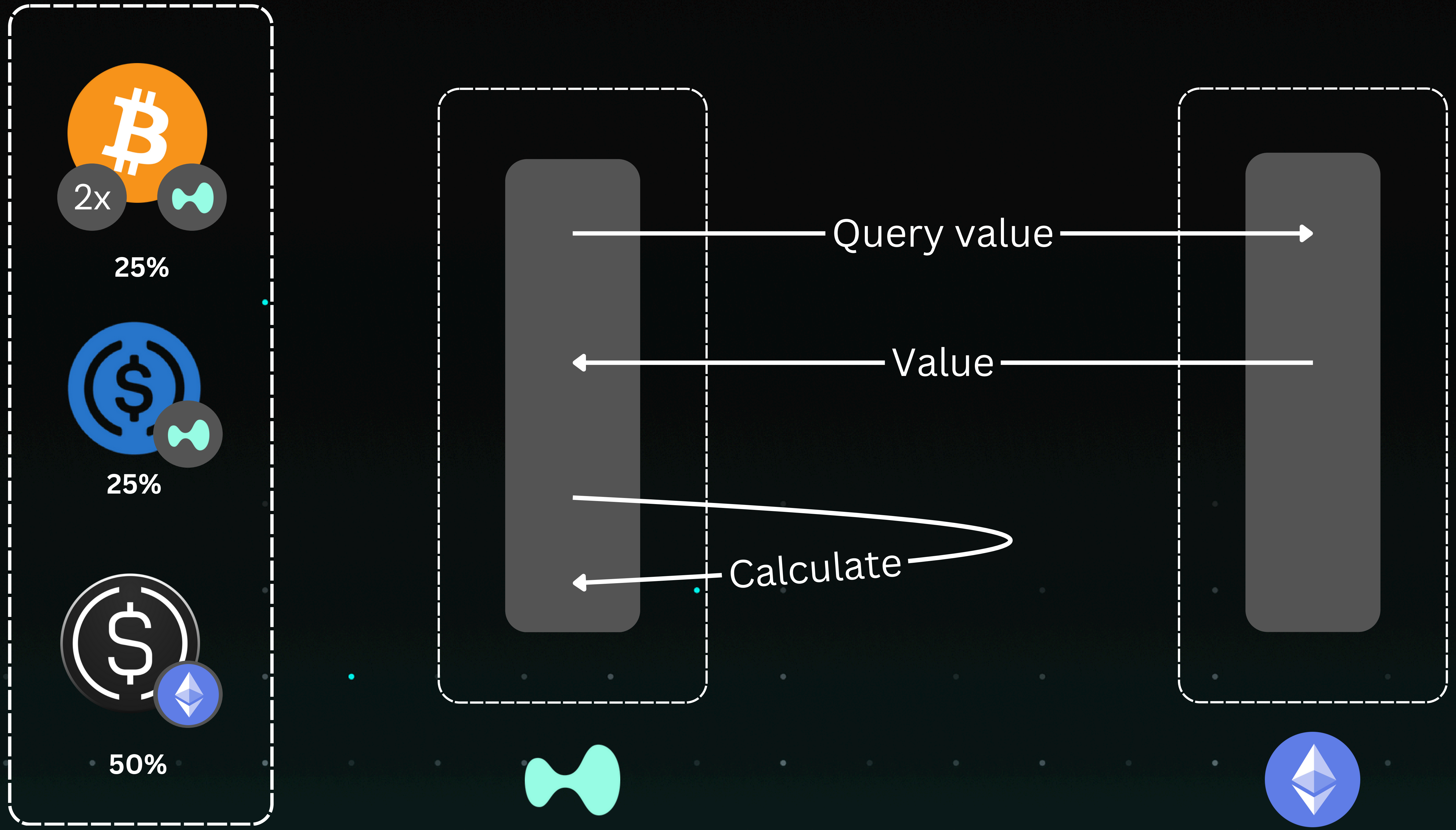


TREND_BTC

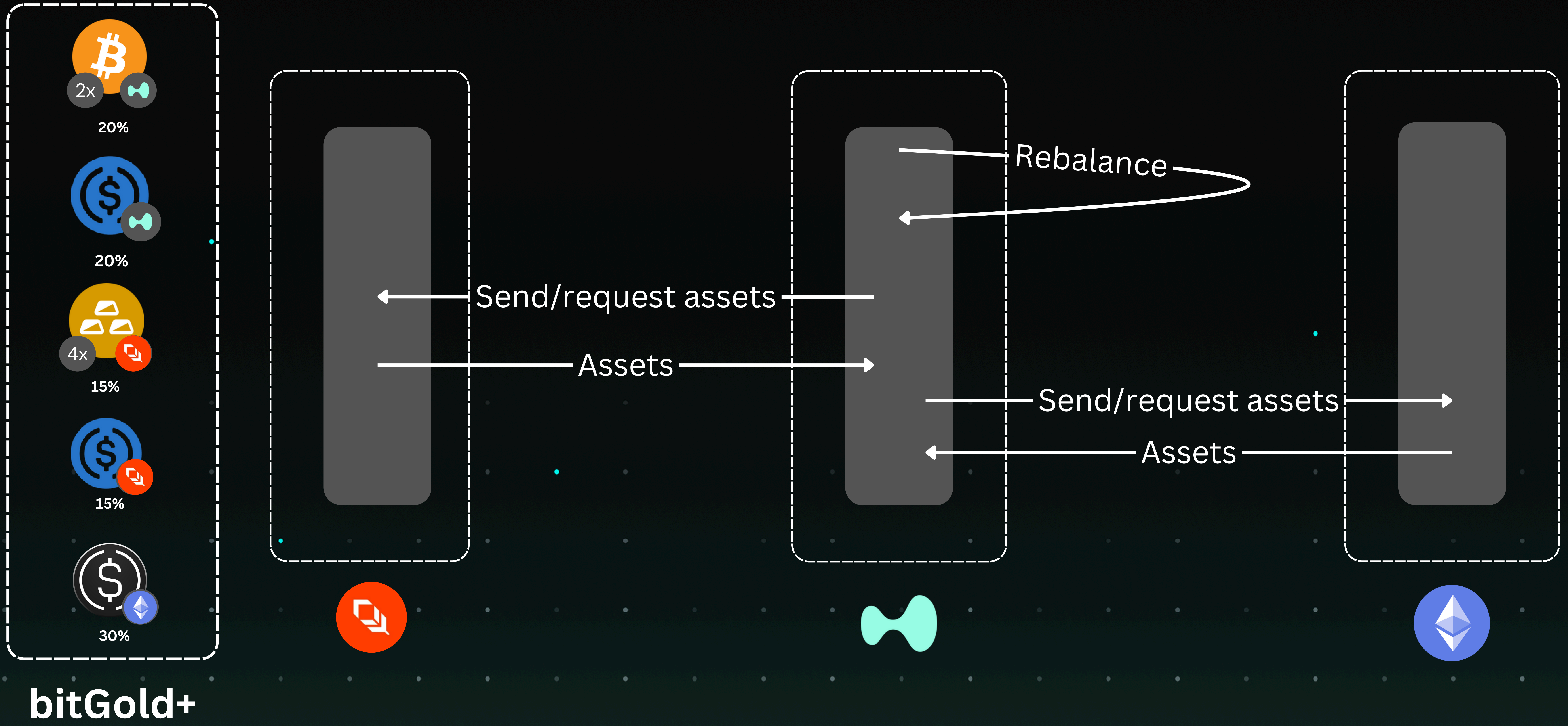
How about share value calculation?



trendBTC

TREND_BTC

Simple enough... but what if you added gold?



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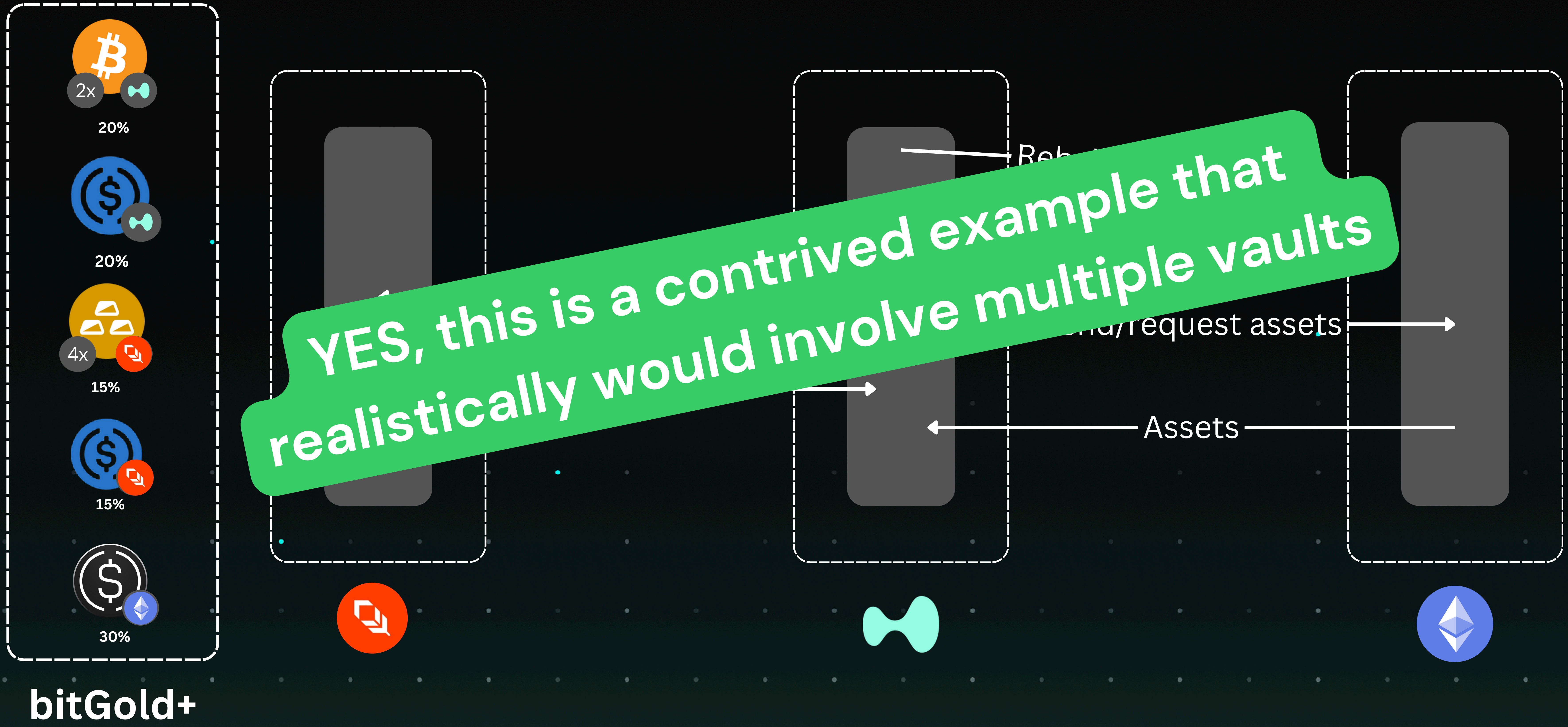
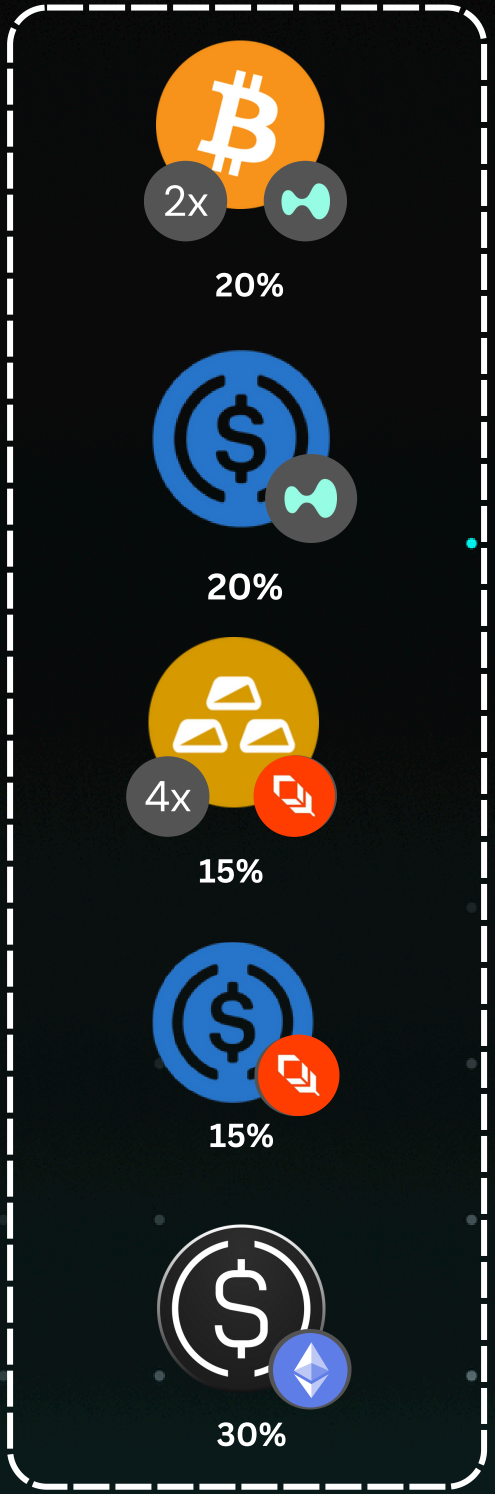


YES, this is a contrived example that realistically would involve multiple vaults

TREND_BTC

Do intents enable multi-chain vaults?



bitGold+

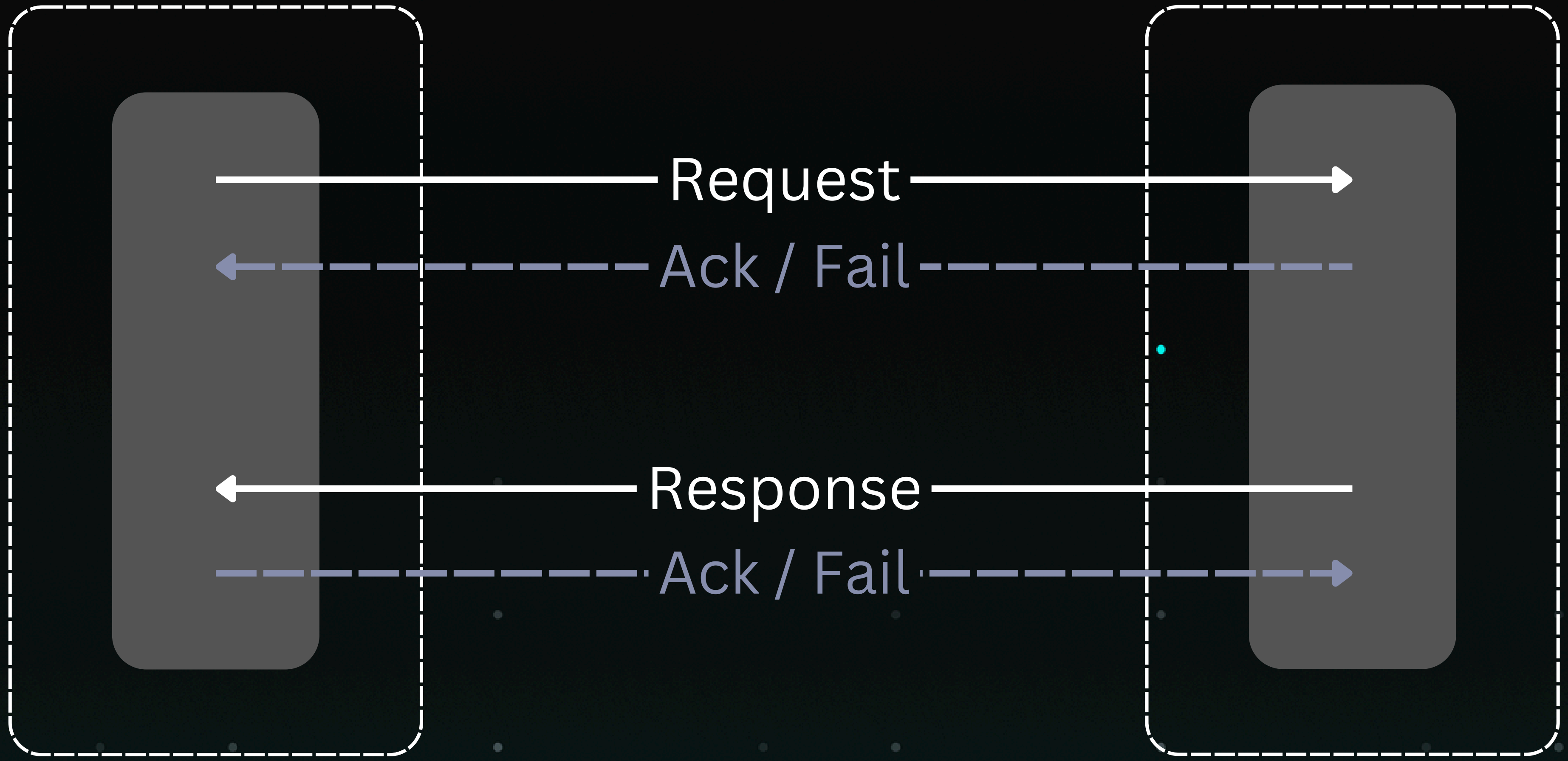
	Plume	Hyperliquid	Ethereum
Have	15% XAU*4 15% USDC	20% USDC 20% BTC*2	30% sUSDe
Want	25% XAU*4 25% USDC	5% USDC 5% BTC*-2	40% sUSDe

What if this vault held $100M+? What solver has this size?

ASYNC APPS

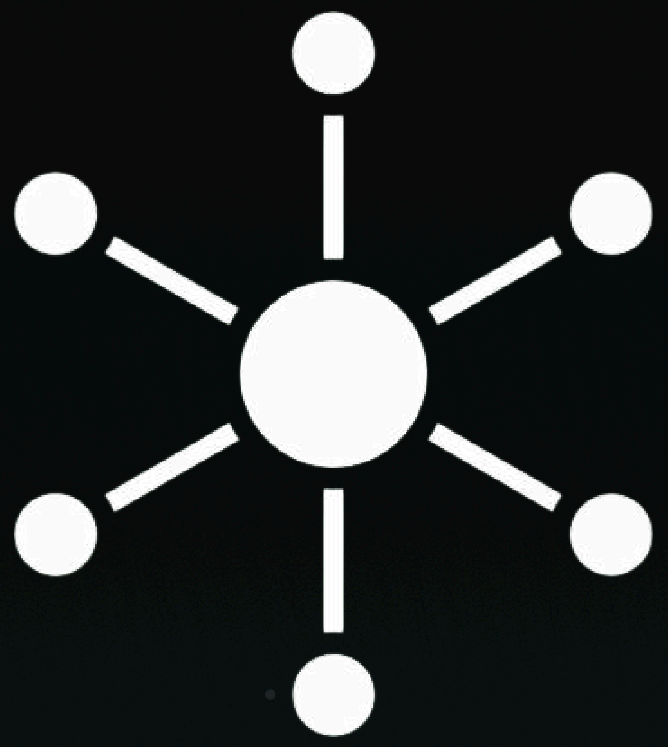
So, what do cross-chain apps require?

1. Cross-chain messaging
2. State persistence
3. Failure recovery
4. Authentication
   a. Service registration
5. Name resolution
   a. Service discovery

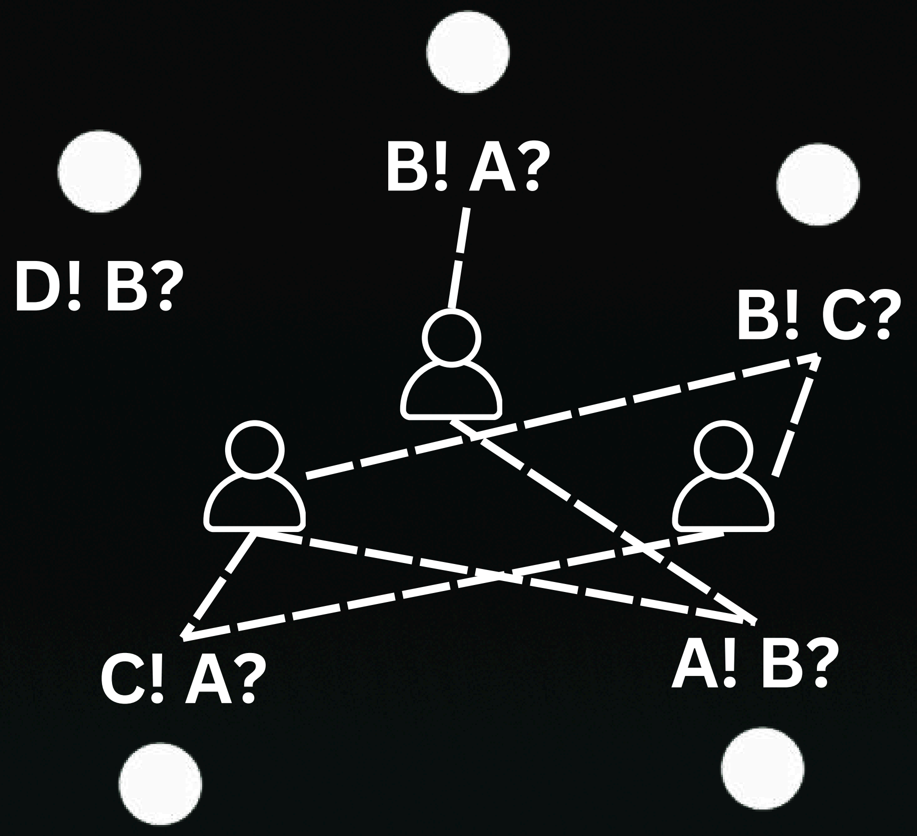


ARCITECTURE

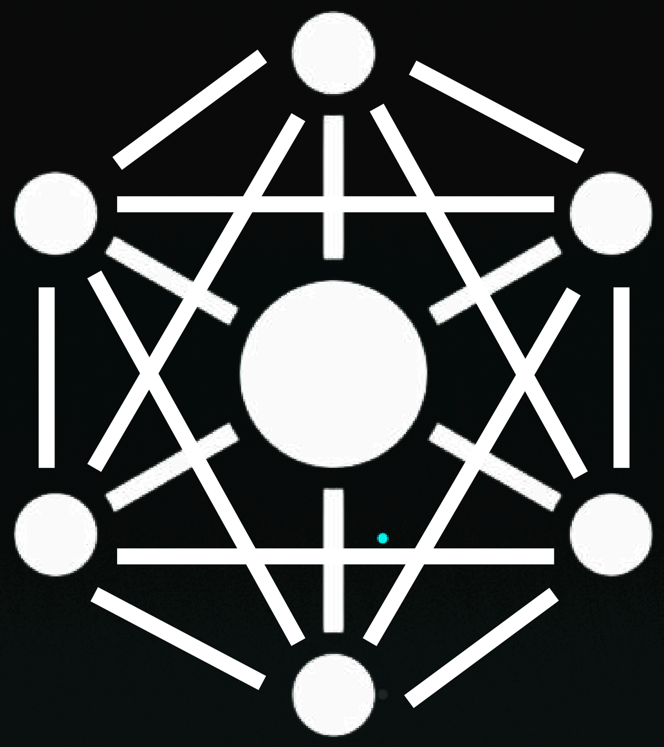
Cross-chain architectural patterns



Hub & Spoke



Intent-based

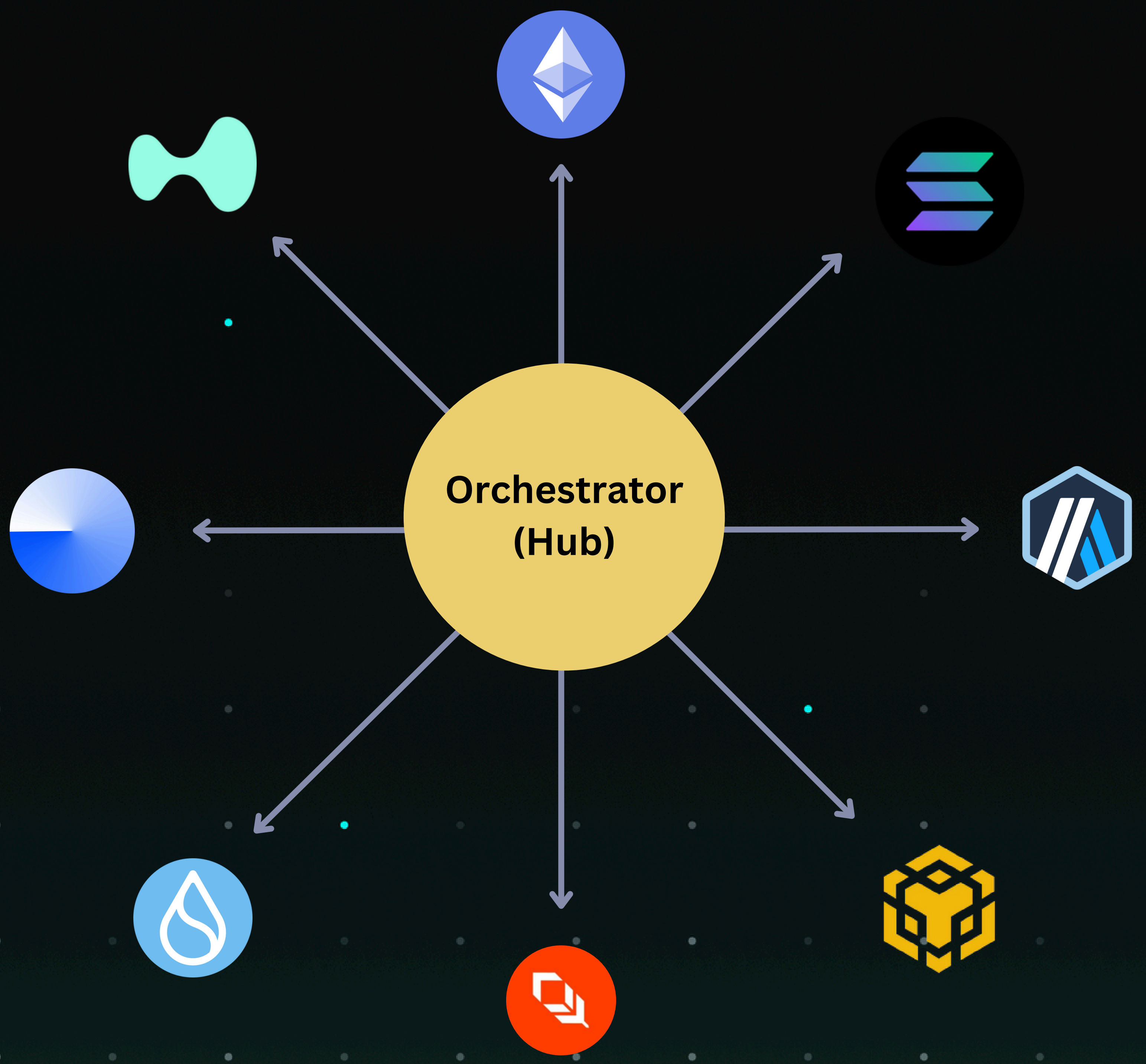


Mesh

AXELAR XION

ACROSS

ARCHITECTURE Hub & Spoke: coordinated async operations



Benefits

- Deterministic execution
- Easily verifiable
    - ○ Error-resilient

Limitations

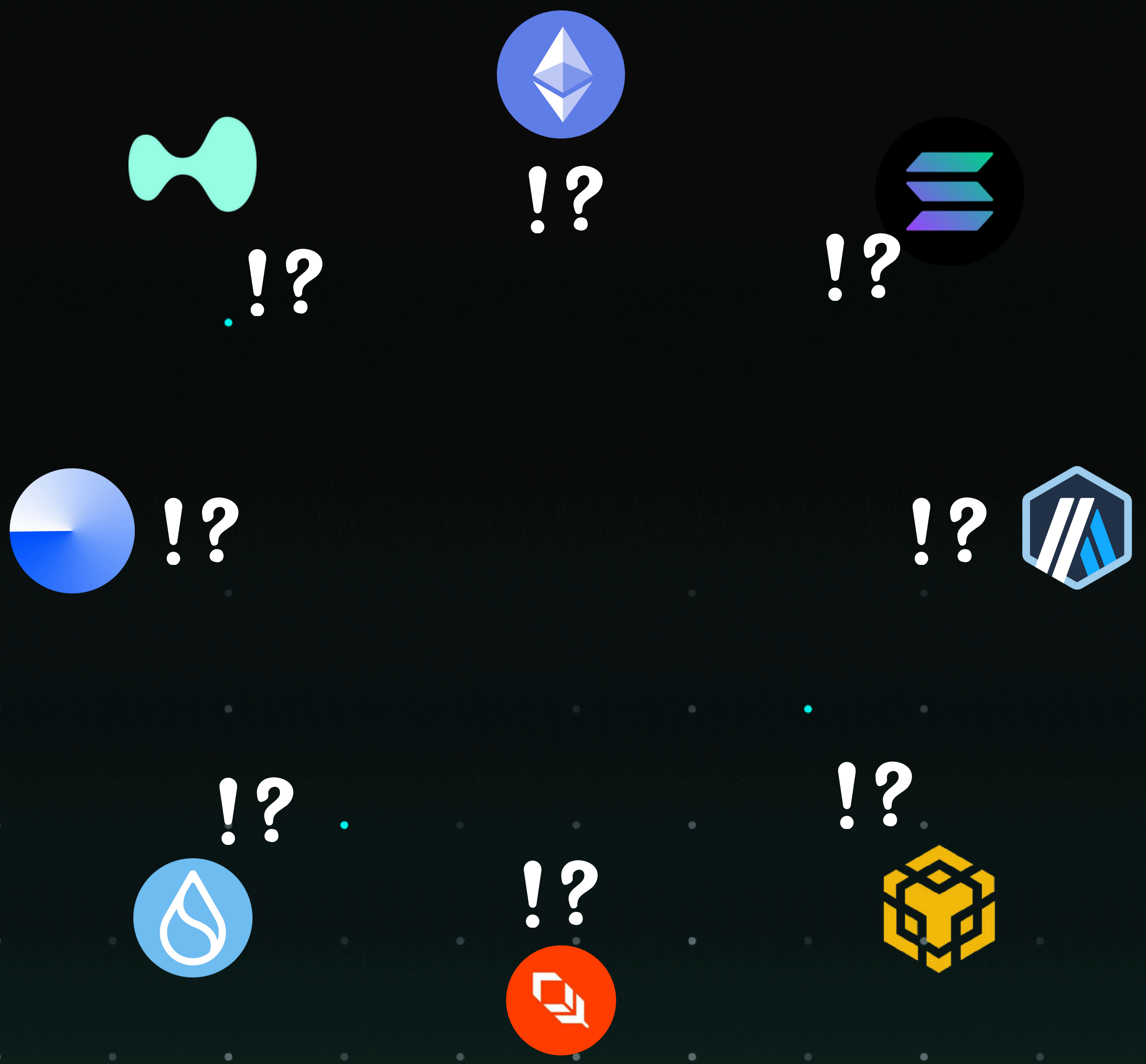
- Single point-of-failure
- Constrained by hub throughput

Example:

- Cross-chain vaults
- Axelar GMP
- Interchain accounts

ARCHITECTURE

Intent-based: off-chain coordination



Benefits

- High capital efficiency
- Time-independent execution
- Solver-failure resilient

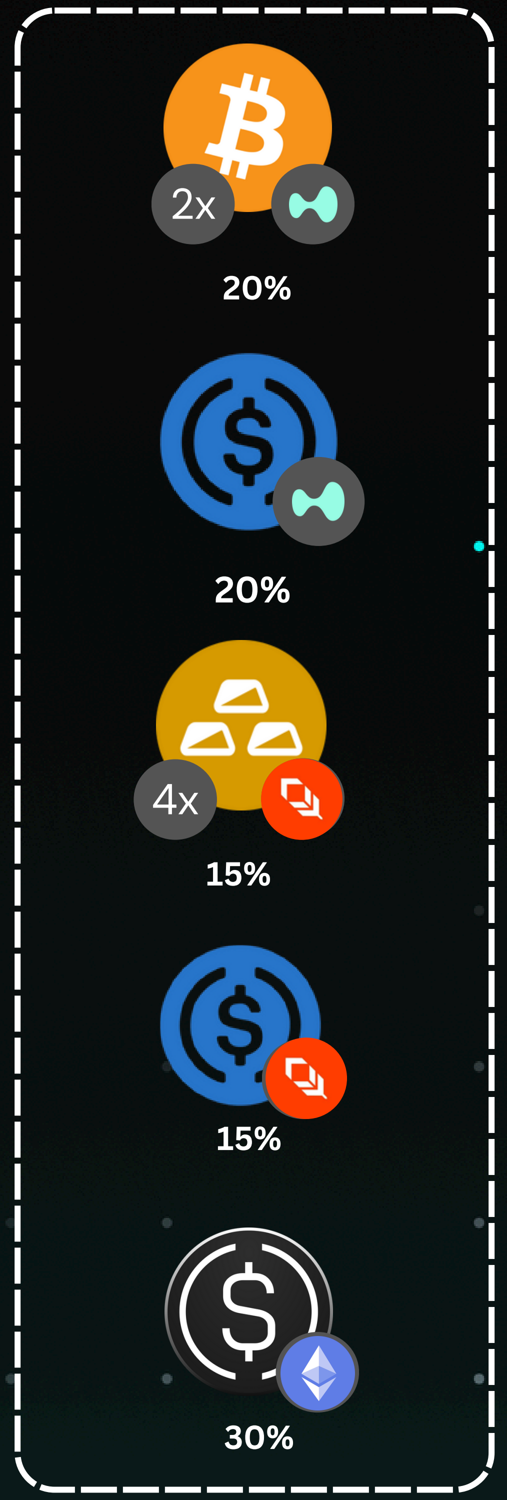
Limitations

- Reliance on economic incentive
  - ○ Limited here!
- Non-deterministic execution

Example:

- Cross-chain liquidity agg

CASE STUDY bitGold+ Vault – design pattern

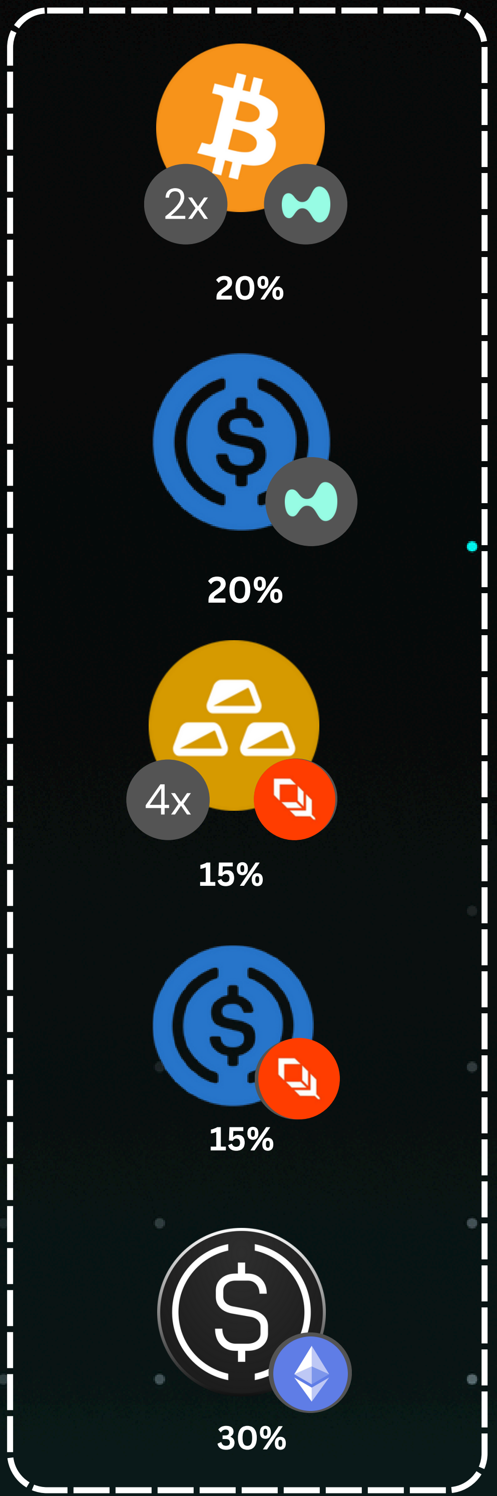


bitGold+

Our vault needs to:	Best Executor
1. Rebalance assets	Protocol / Intents
2. Calculate share values	Protocol
3. Process shares	Vault (local)

…no single pattern is sufficient

TECH Universal accounts as an authentication & intents layer



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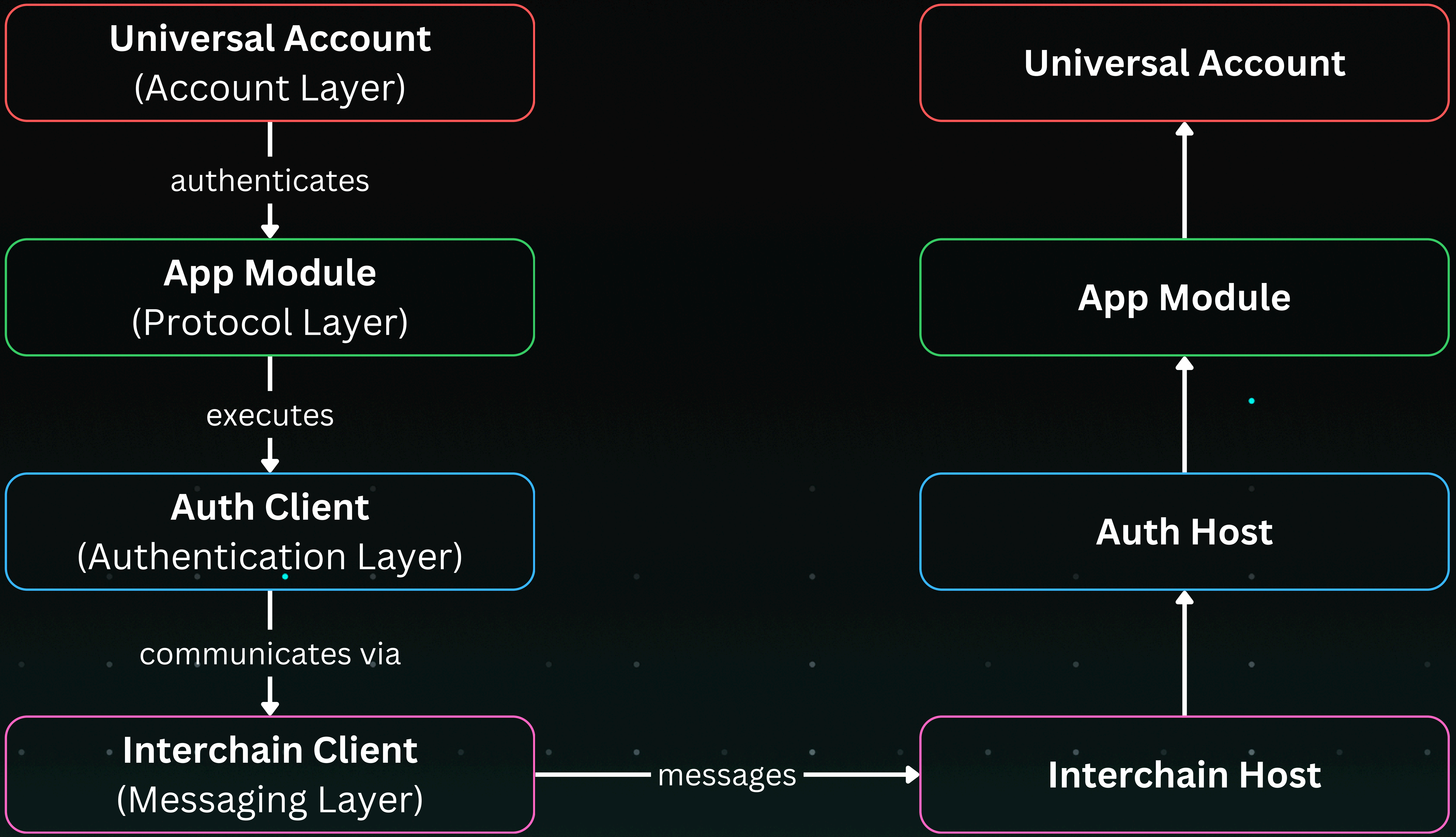


Universal Account
(Account Layer)

authenticates

App Module
(Protocol Layer)

executes

Auth Client
(Authentication Layer)

communicates via

Interchain Client
(Messaging Layer)

messages

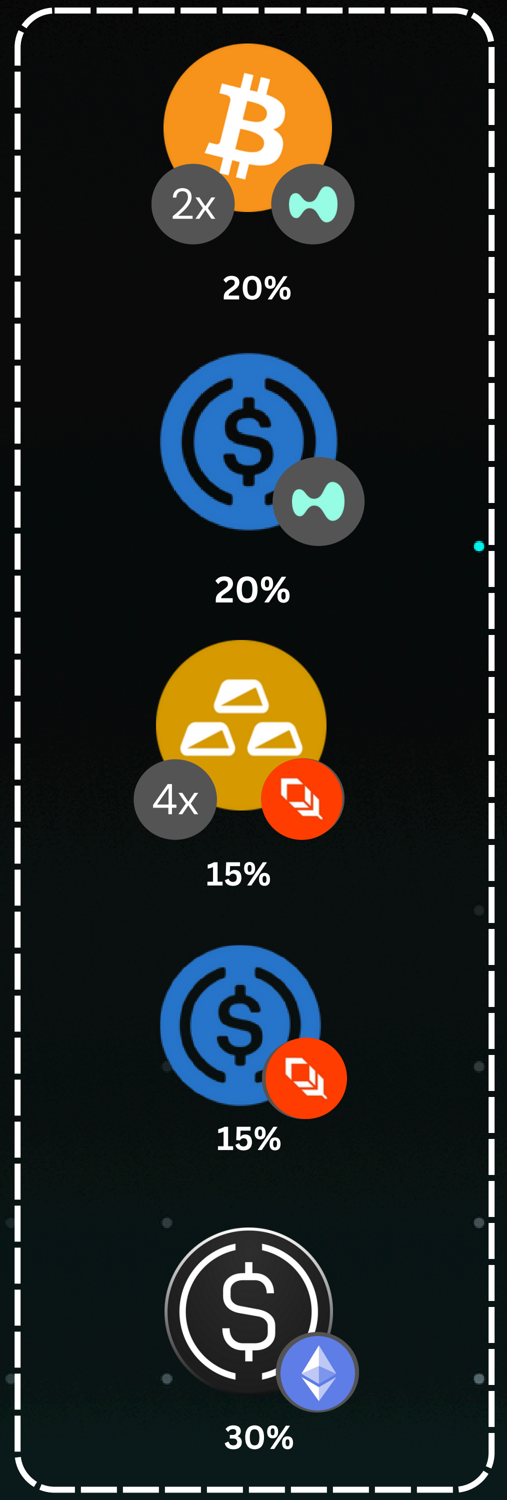
Interchain Host

Auth Host

App Module

Universal Account

TECH Universal accounts as an authentication & intents layer



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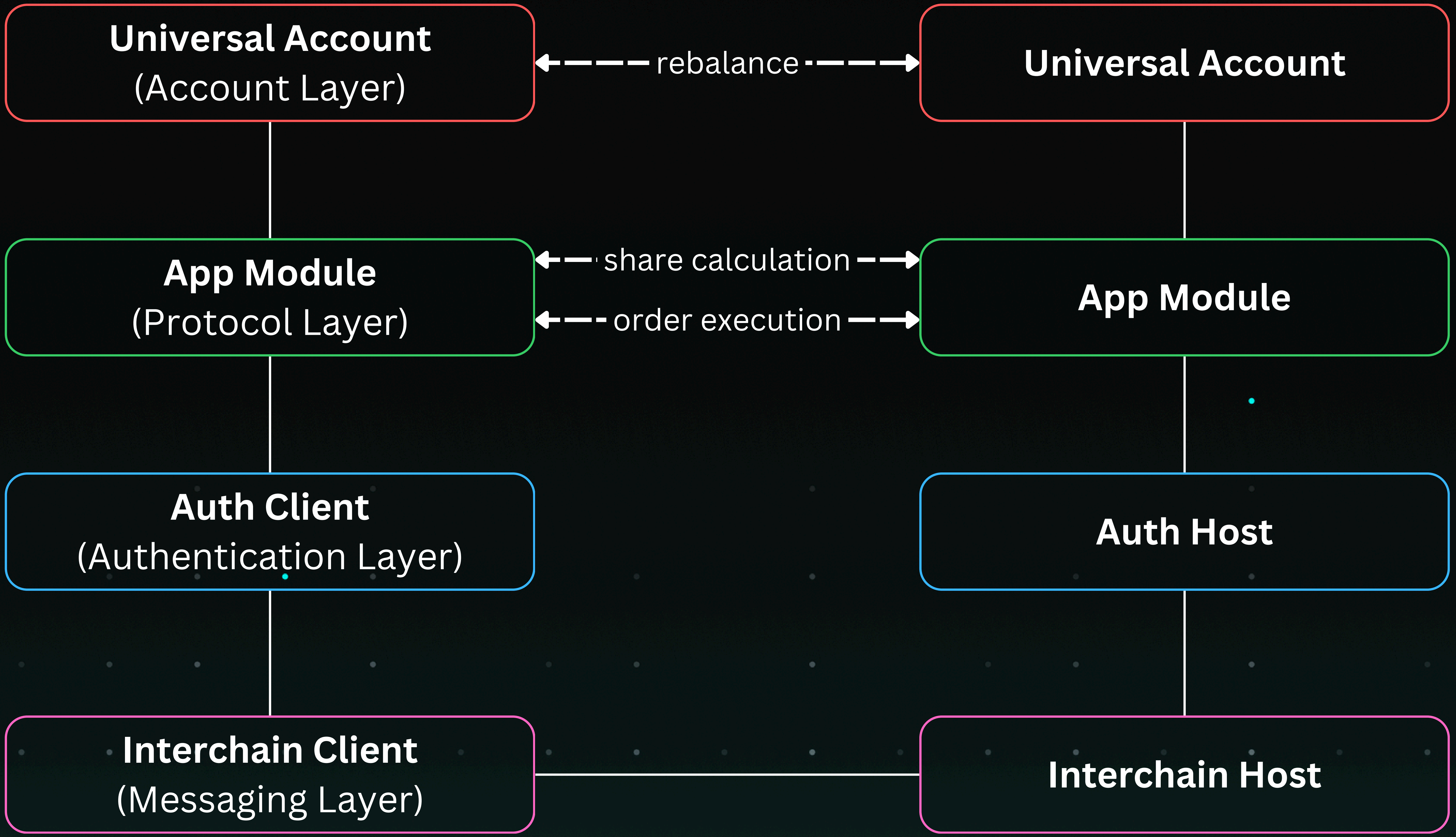

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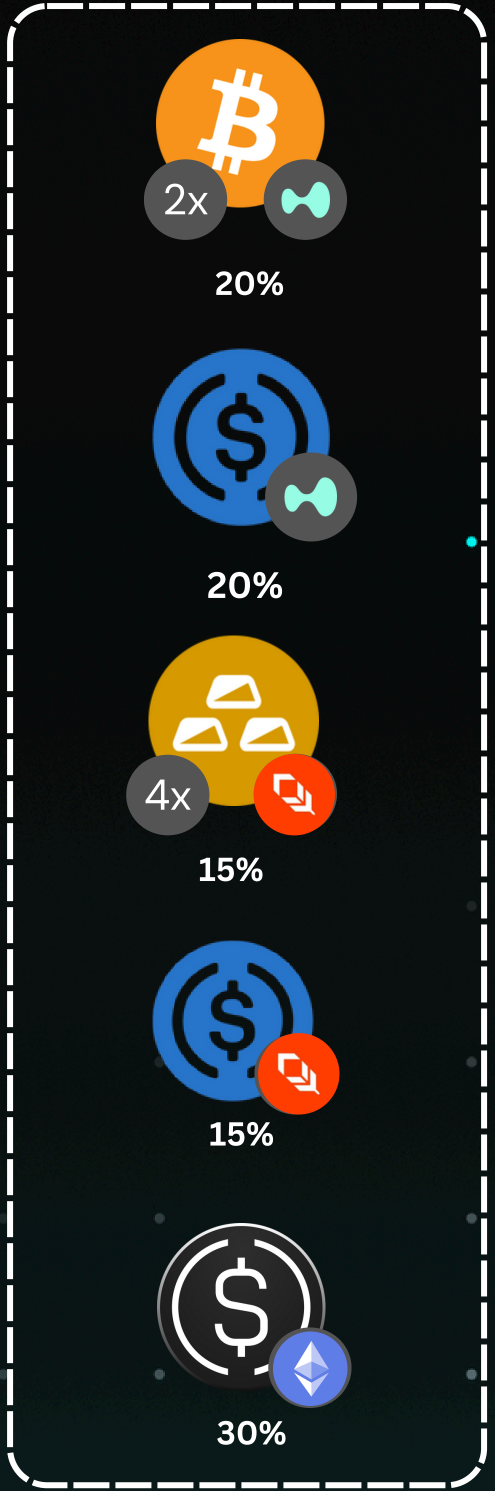

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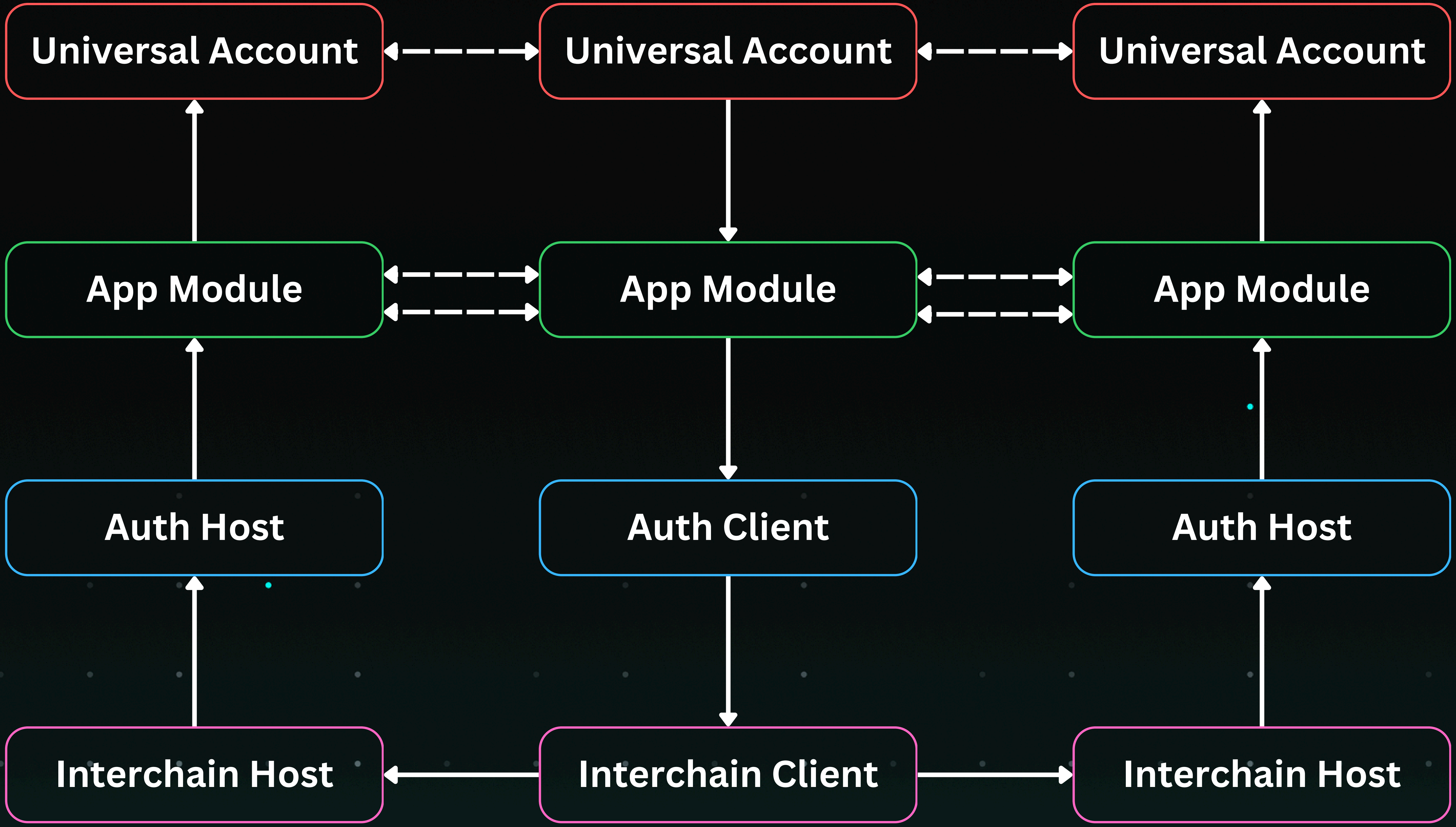

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ABSTRACT

SOLUTION Hub & Spoke orchestration + intents solves this

Unified Capabilities:

- ✓ Balances
- ✓ Transfers
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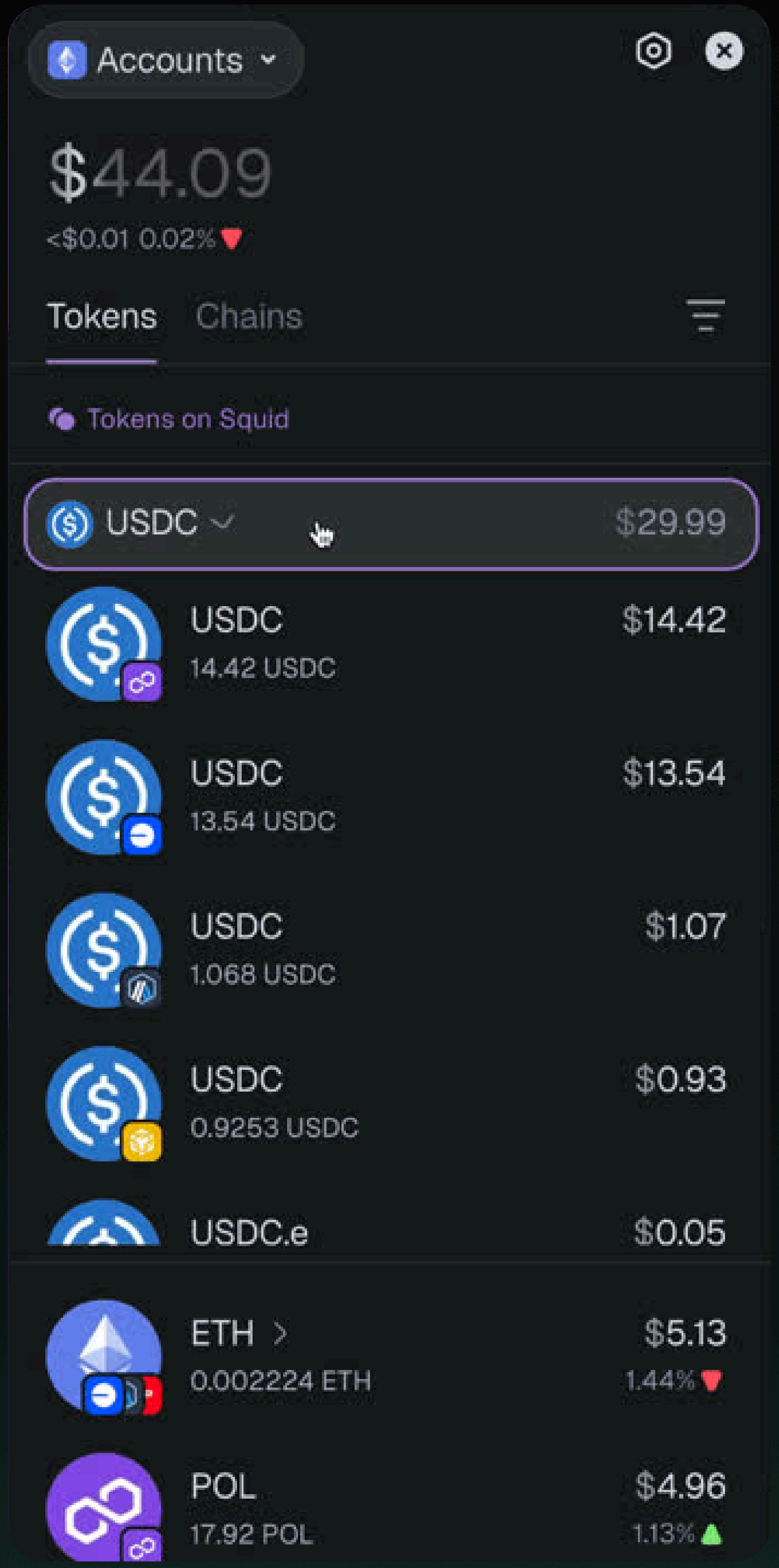
Limitations

- ✓ Cross-chain protocols
- ✓ Fragmented liquidity
- ✓ Decentralized execution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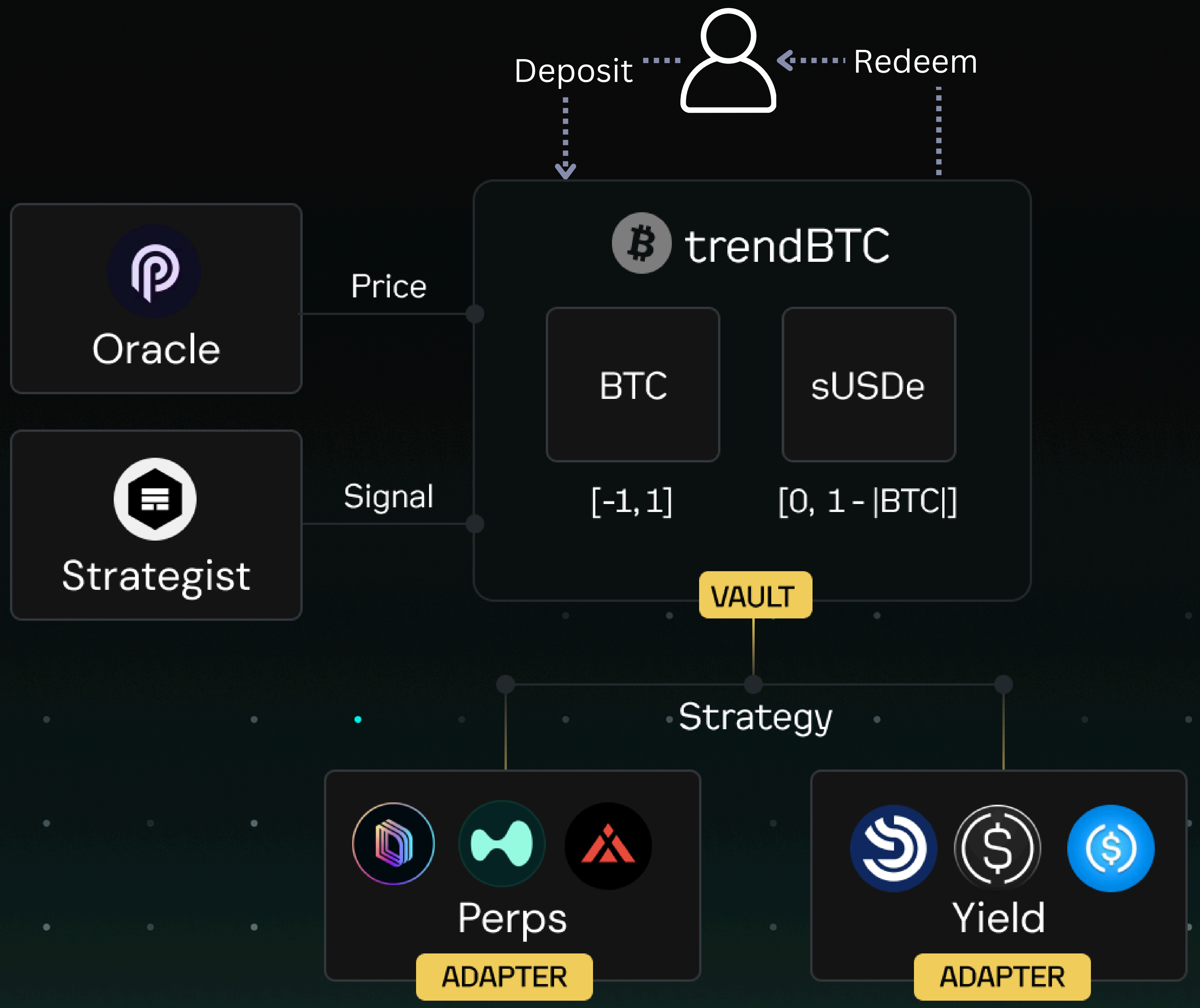
TECH

Factor Asset Orchestration

Battletested infrastructure for autonomous strategy execution



Our Technical Advantage

Asynchronous (ERC-7540)

- Low-cost execution

Multi-strategy

- Enhancing returns

Multiple liquidity sources

- Intent-based perpetuals, CEX & DEX

ABSTRACT SDK   Symmio™

APPENDIX

Build with us!

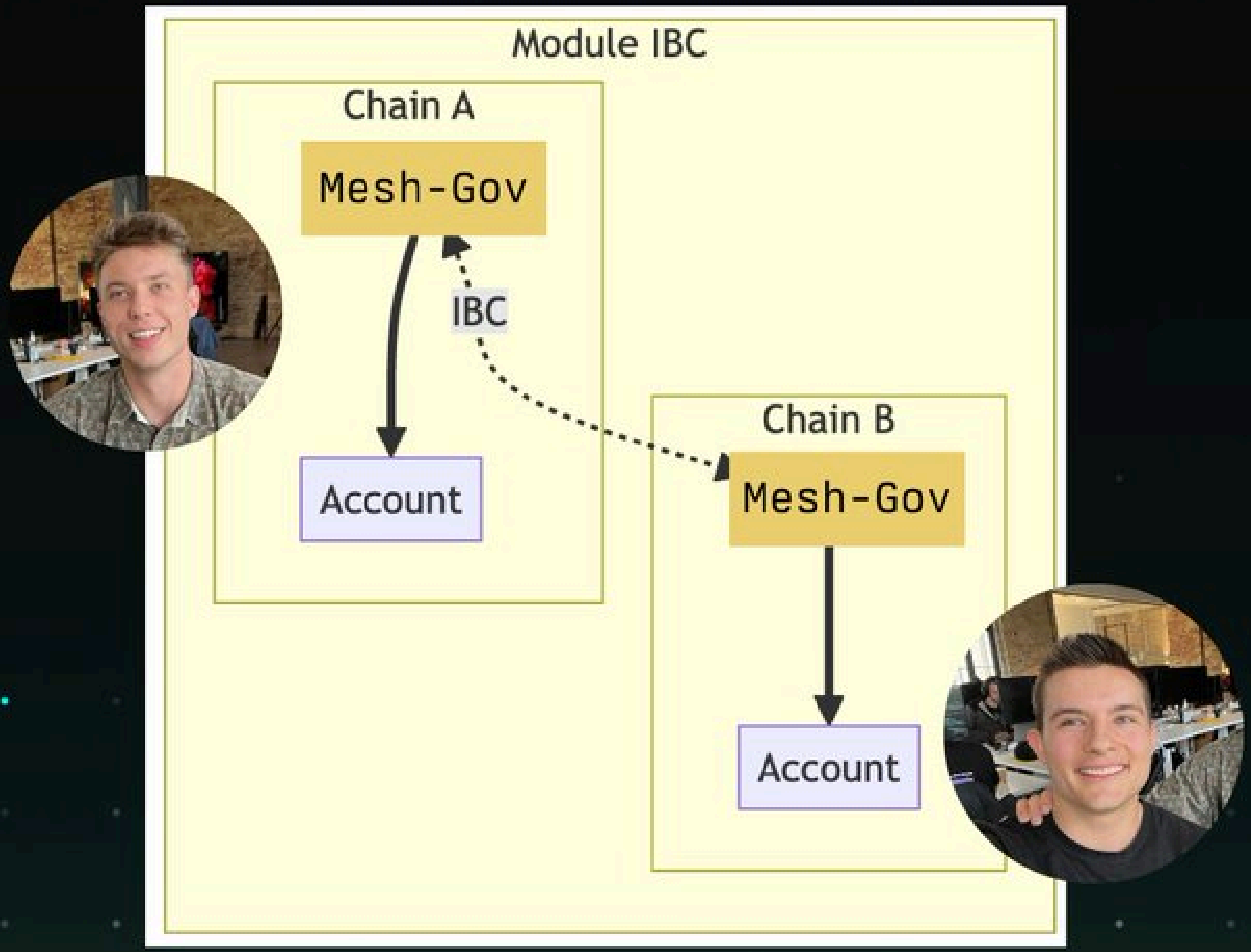
- https://abstract.money
- https://docs.abstract.money

- https://twitter.com/AbstractSDK

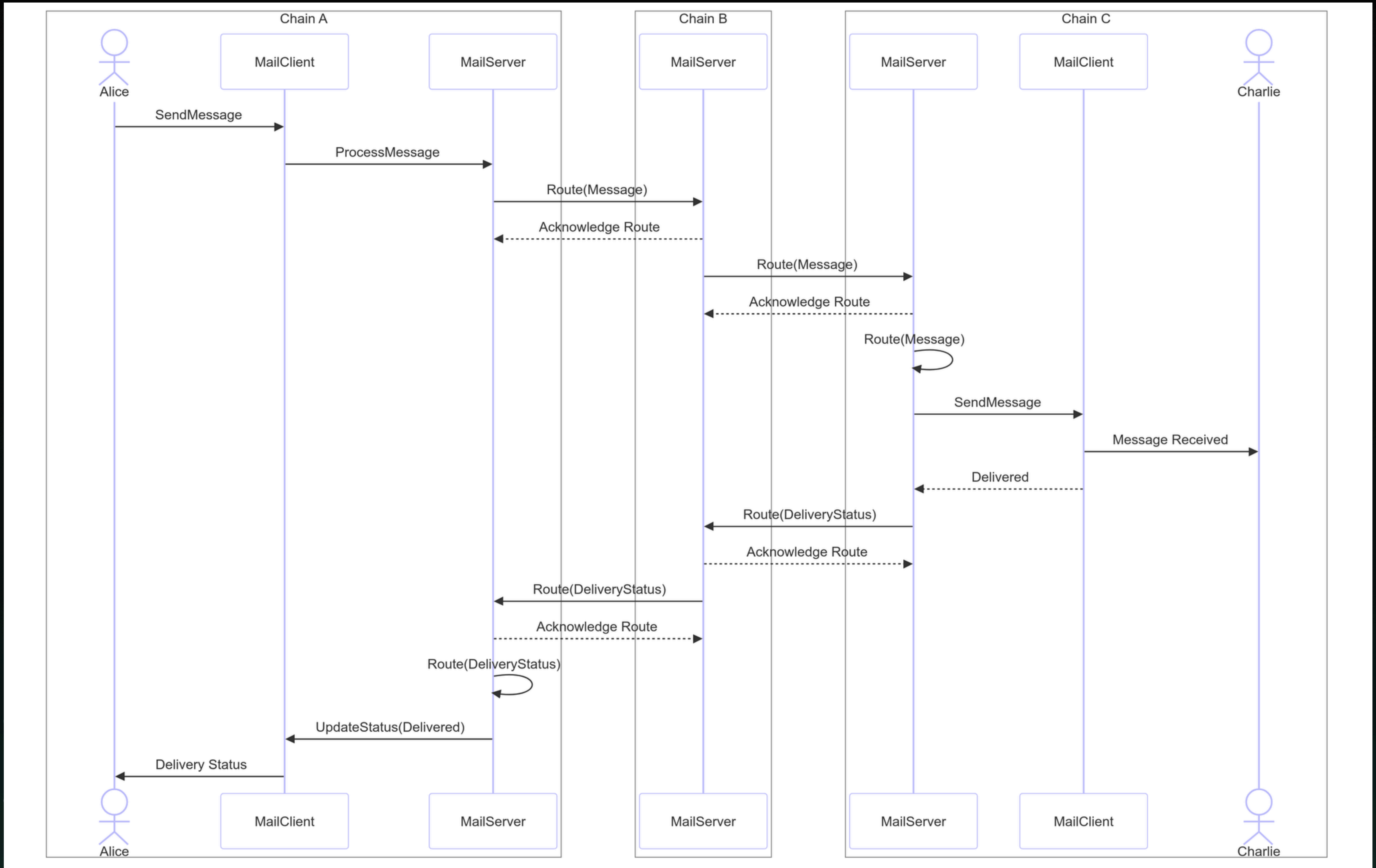
- https://github.com/AbstractSDK

APPENDIX

Real World Examples

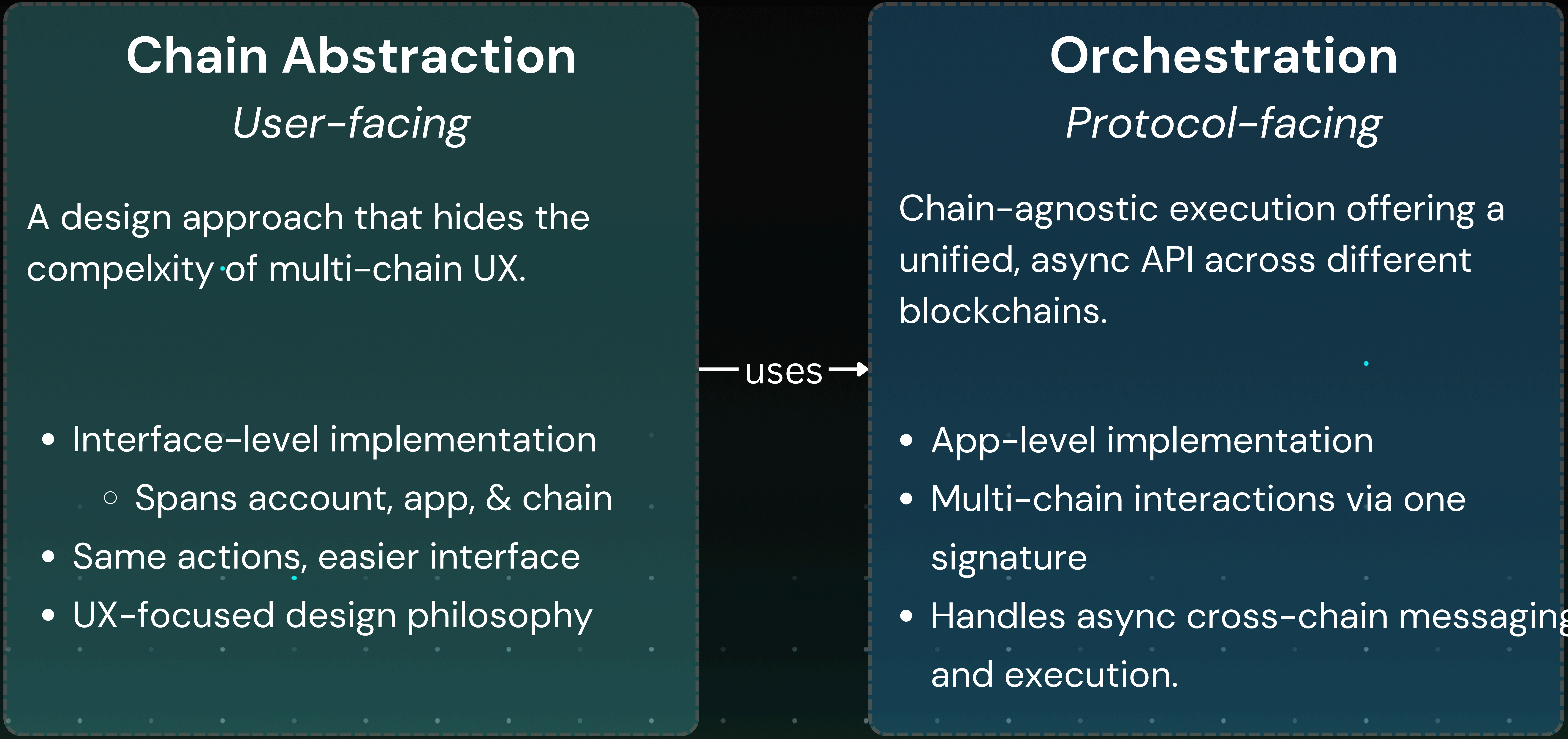


APPENDIX Interchain Mail



APPENDIX

Chain Abstraction vs Orchestration



Chain Abstraction

User-facing

A design approach that hides the compelxity of multi-chain UX.

- Interface-level implementation
  - ○ Spans account, app, & chain
- Same actions, easier interface
- UX-focused design philosophy

—uses→

Orchestration

Protocol-facing

Chain-agnostic execution offering a unified, async API across different blockchains.

- App-level implementation
- Multi-chain interactions via one signature
- Handles async cross-chain messaging and execution.

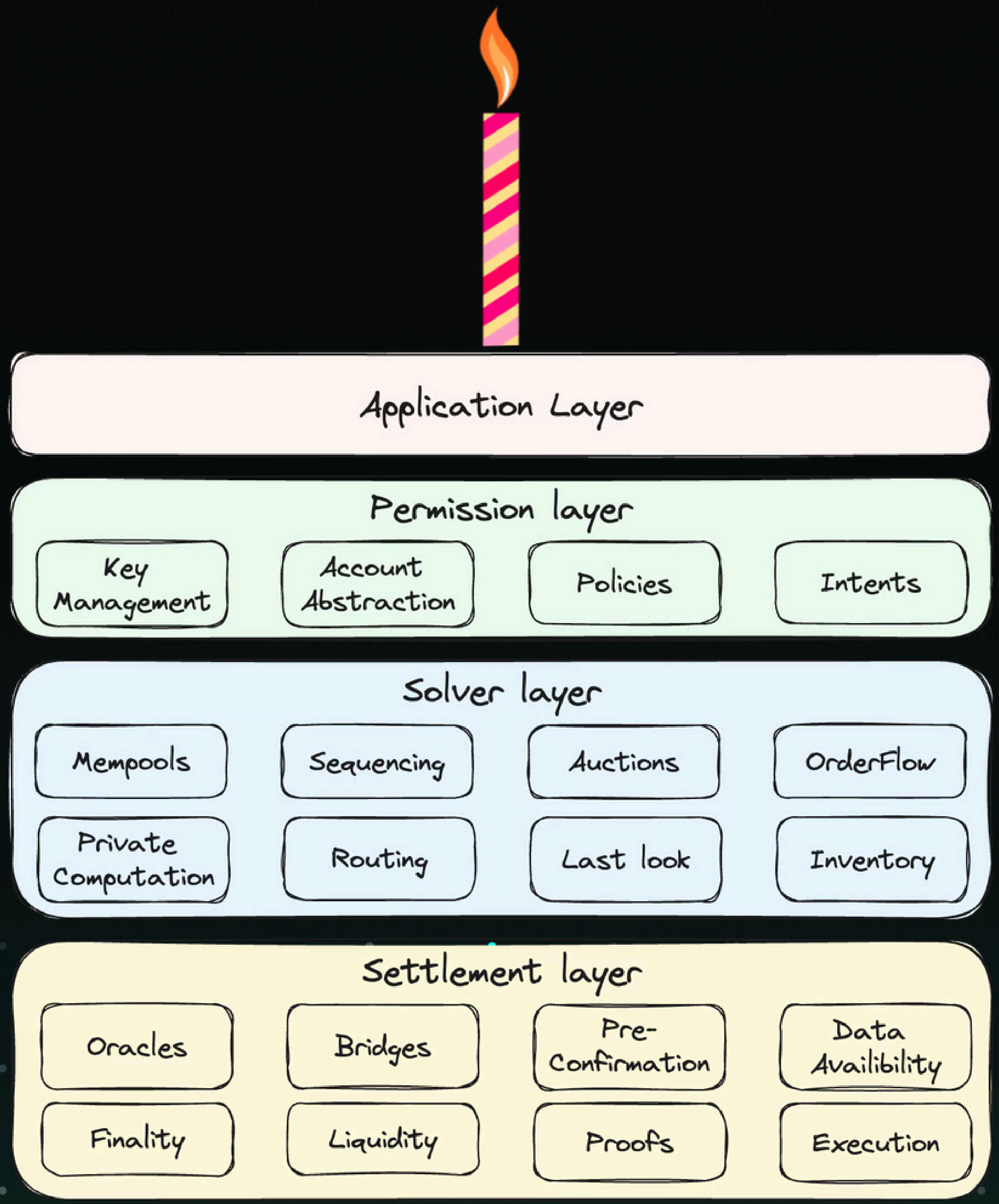
APPENDIX

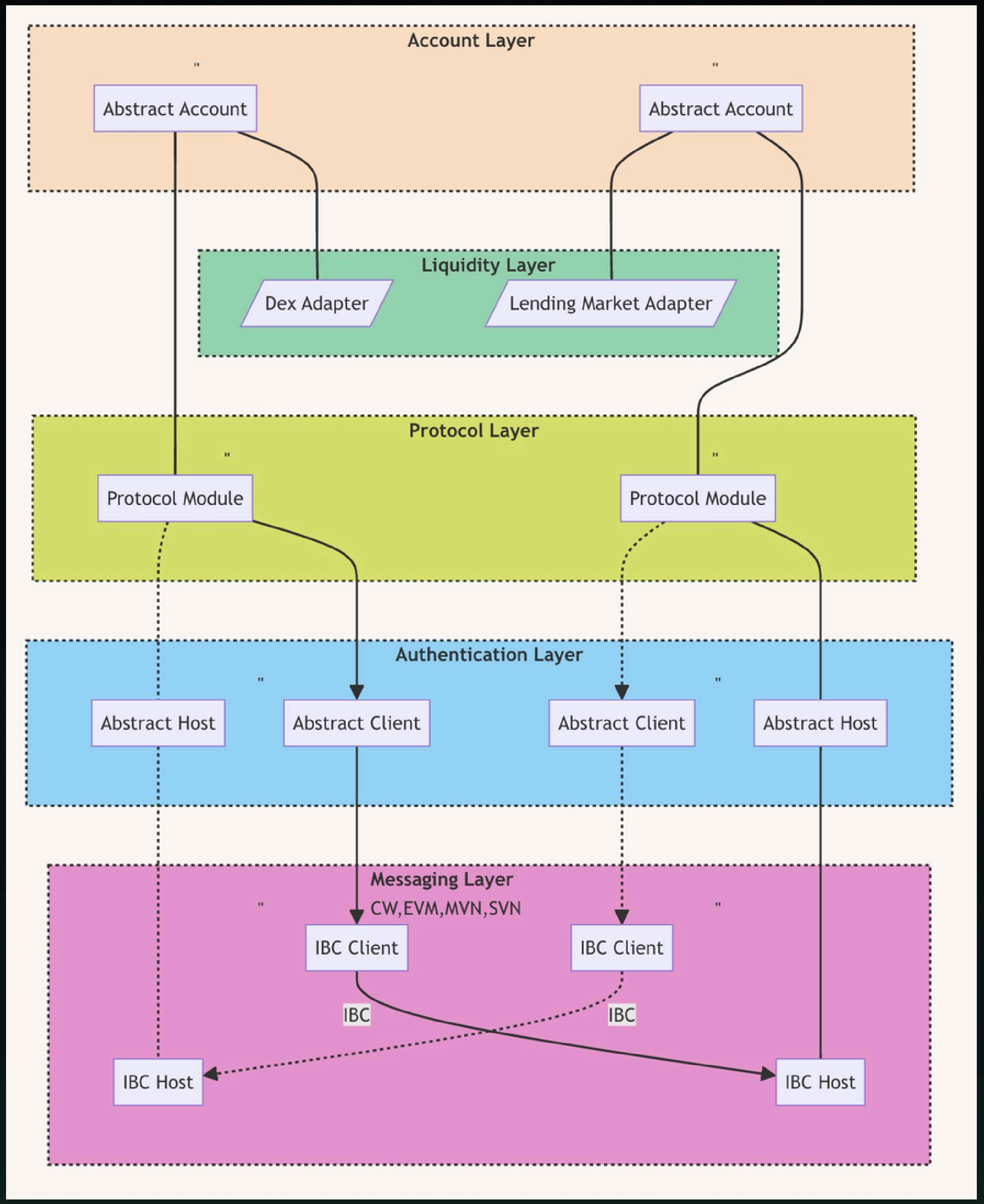
Cross-chain architectural patterns

	Hub & Spoke	Intent-based	Mesh
Control Flow	Centralized through hub (predictable)	Desired outcomes expressed (unpredictable)	Peer-to-peer (distributed)
Capital Efficiency	Medium (assets flow through hub)	High (optimal execution paths)	Medium (direct, but unoptimized)
Centralization Risk	Medium-high (hub dependency)	Low (multiple solvers)	Low (no central point)
Development Complexity	Low (clear architecture)	Medium	High (n^2 connections)
Best For	Orchestrated workflows, verification	Liquid Apps	Distributed apps

TECH

Cross-chain app stack


Application Layer
Permission layer
Key Management
Account Abstraction
Policies
Intents
Solver layer
Mempools
Sequencing
Auctions
OrderFlow
Private Computation
Routing
Last look
Inventory
Settlement layer
Oracles
Bridges
Pre-Confirmation
Data Availibility
Finality
Liquidity
Proofs
Execution


Account Layer
Abstract Account
Abstract Account
Liquidity Layer
Dex Adapter
Lending Market Adapter
Protocol Layer
Protocol Module
Protocol Module
Authentication Layer
Abstract Host
Abstract Client
Abstract Client
Abstract Host
Messaging Layer
CW,EVM,MVN,SVN
IBC Client
IBC Client
IBC
IBC
IBC Host
IBC Host