



Web3 Invest NY Tech Week 2025

Combining Machine Learning, TradFi and
Cryptocurrencies: A Glimpse of What's
Possible



About Us

Vault42 is a research-driven trading firm developing fully automated Bitcoin strategies powered by quantitative models and machine learning. We focus on capturing regime shifts, trend dynamics, and market inefficiencies through intelligent, adaptive systems. Our strategies are deployed and managed on-chain, combining real-time transparency with the control and oversight of centralized governance. We believe this hybrid model represents the future of asset management: actively managed, algorithmic portfolios delivered with unprecedented clarity, efficiency while focusing on protecting capital.

AGENDA



1. Traditional portfolio construction: portfolio optimization.
2. Using machine learning in portfolio optimization: hierarchical risk parity.
3. Creating a digital asset trading strategy.

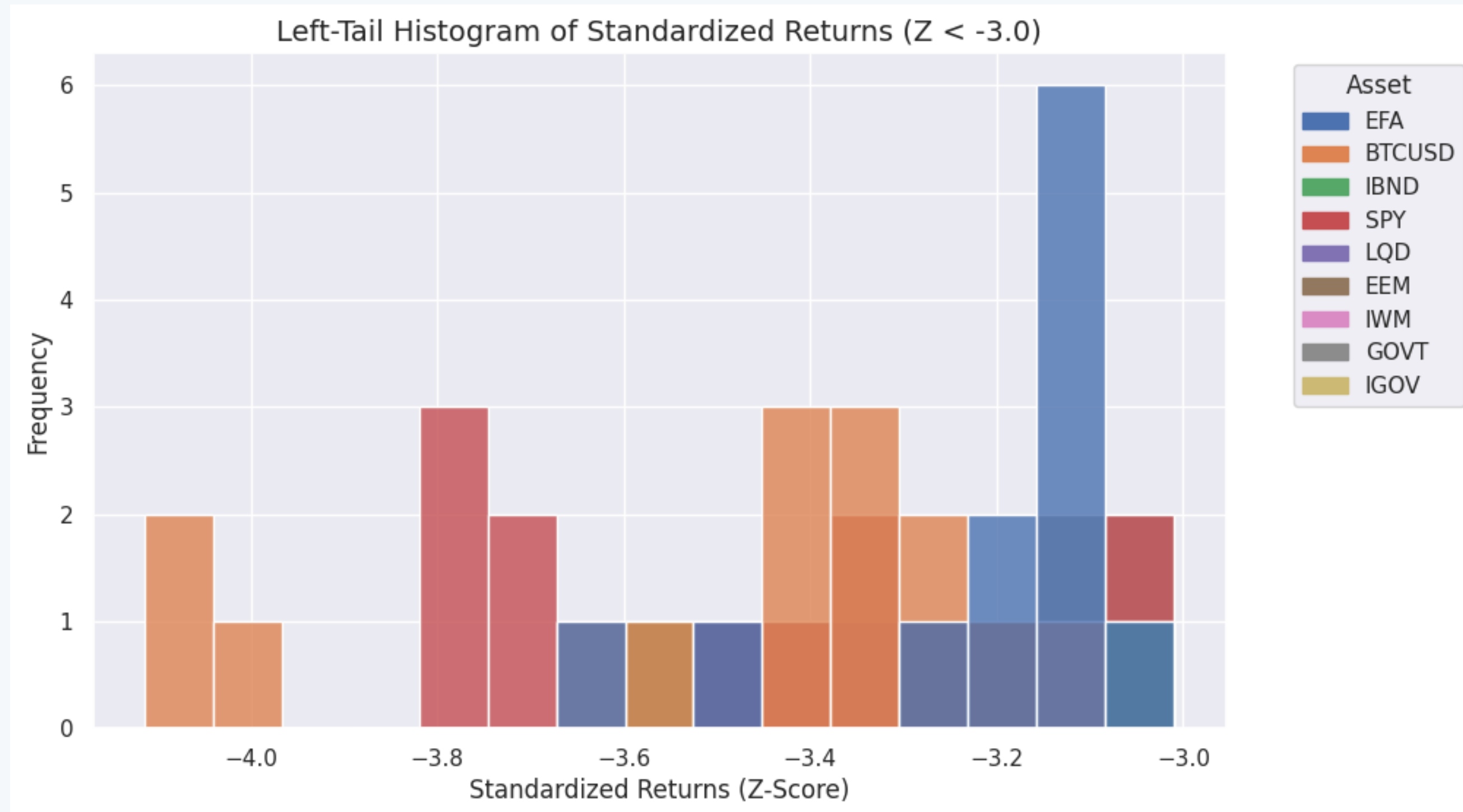
Portfolio Optimization

- The first step in portfolio construction is to build an asset allocation policy (which assets and how they should be weighted).
- Portfolio optimization will tell you the optimal mix to achieve a certain objective:
 - Highest return for least amount of risk.
 - Minimum variance.
 - Maximum Sharpe ratio.
 - Target risk/reward profile (e.g., I want 6% a year return).
- Portfolio optimization is somewhat ubiquitous in the asset management area, but it has many problems.

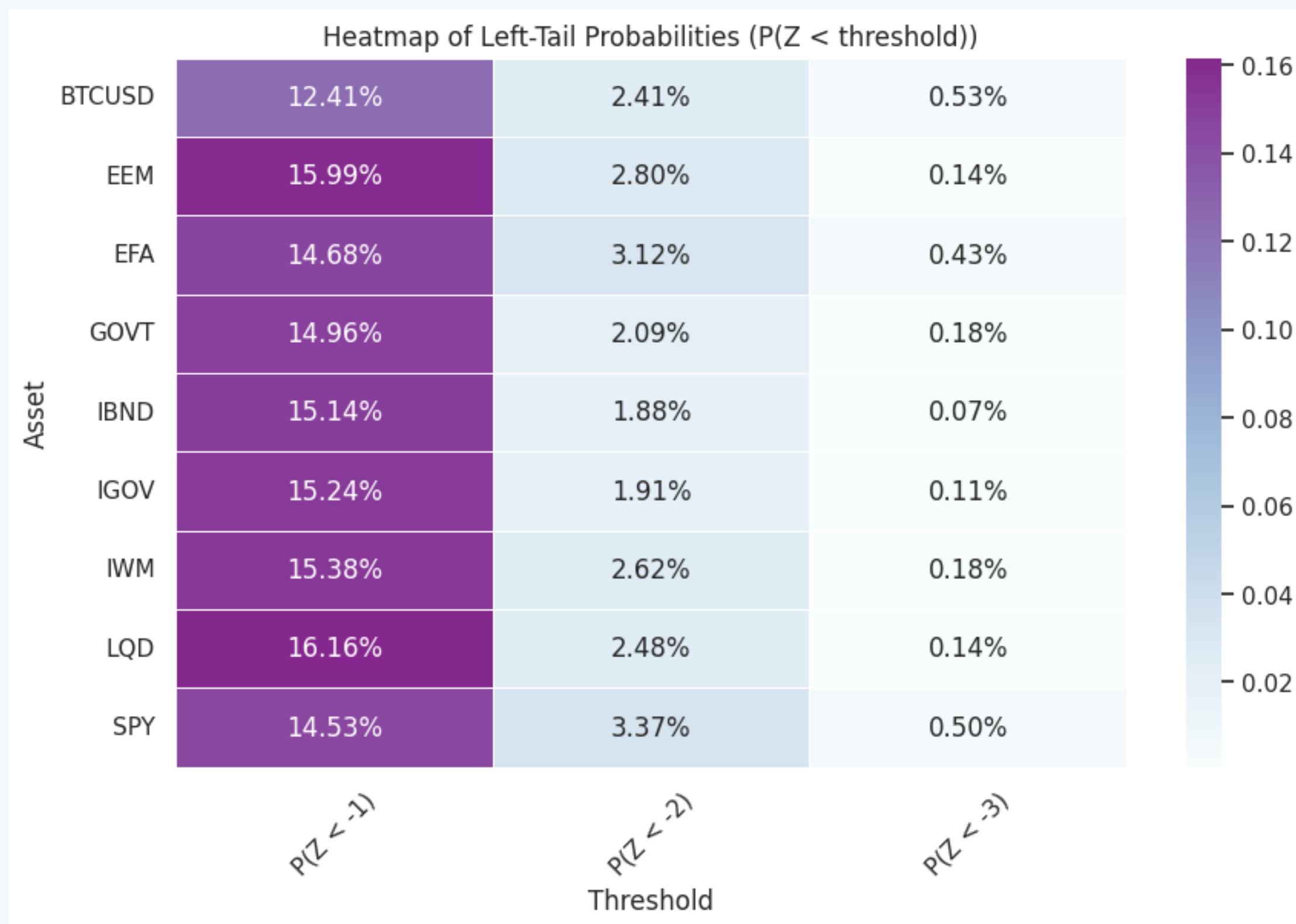
Machine Learning

- Hierarchical risk parity is a portfolio allocation method that distributes risk without relying on inverting the covariance matrix (unlike Markowitz).
- Developed by Marcos López de Prado to improve robustness and avoid issues like instability and overfitting in traditional optimization.
- Assets are clustered based on their correlations, and weights are recursively assigned from larger clusters down to individual assets.
- Each asset's final weight reflects its contribution to overall portfolio risk, considering both volatility and correlation structure.
- This gives us a solid risk management framework!

BTC & Risk Management



BTC & Risk Management



Digital Assets

- The crypto currency universe is diverse and while many in the traditional asset management might find these assets too risky for most clients, understanding how these assets behave is a must.
- Slide on risk distribution.
- So, the issue with crypto currencies is that it is not that the average loss is much worse than other assets, rather you have a higher probability of extreme tail losses.
- Thus, risk management strategies, such as HRP can be a great starting point to build crypto currency trading strategies.

Vault42 Hourly BTC Strategy



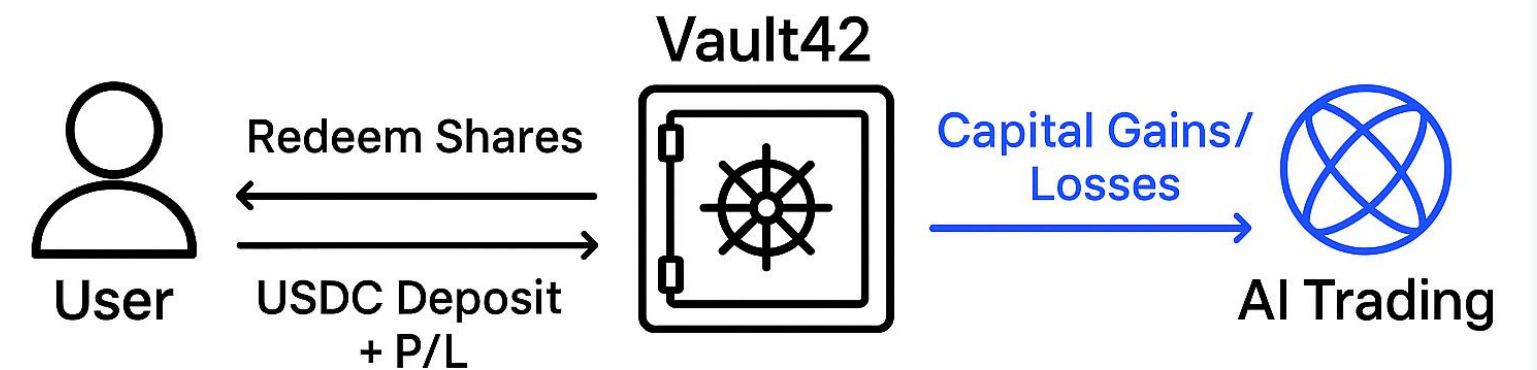
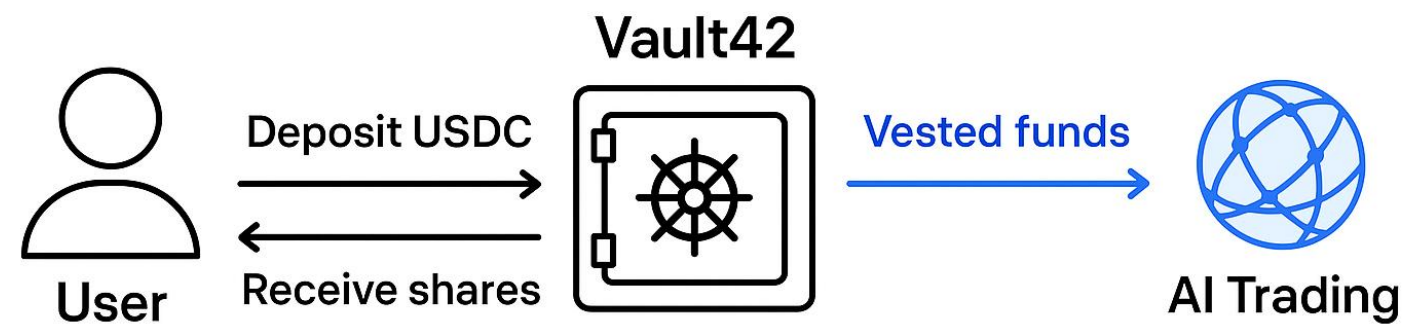
On-Chain Asset Management

- Active asset management by a portfolio manager with over 25 years of experience.
- Automated algorithms that identify price trends, execute trades, without needing constant monitoring.
- Using on-chain vaults, we can use different tokens to increase leverage and manage risk.
- Clients have access to our research, ¹⁰ all strategies under development, and consultation services (strategy development and audits).

Vault Management Using DHedge

Deposit

Withdraw



Active management of diversified, algorithmically driven strategies for multiple digital assets. And all with on-chain custody!



THANK YOU

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