TradeOptix

Algorithm Infrastructure Overview

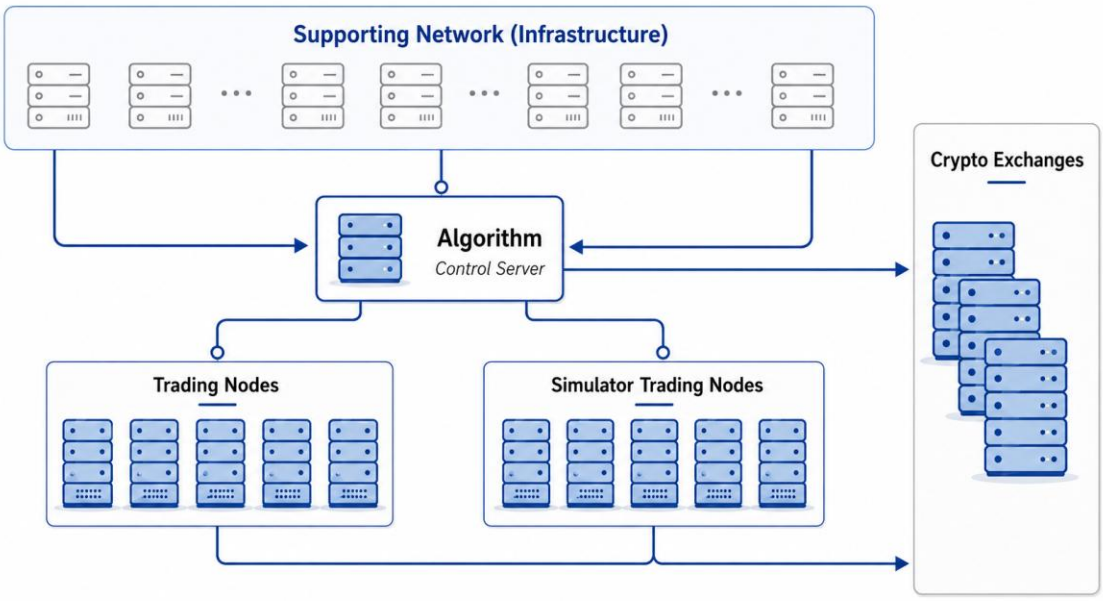
Introduction

This document provides an overview of the infrastructure supporting the algorithmic trading and risk management systems. The design emphasizes scalability, fault tolerance, and security. It separates control servers, trading nodes, data feeds, and signal access to balance performance with security while ensuring institutional-grade reliability.

Main Algorithm Infrastructure

The main algorithm infrastructure is built around a central Control Server, which runs the Adaptive Circuit Breaker and monitors all trading operations. The Control Server manages both live trading nodes and simulator trading nodes:

- **Trading Nodes**: Execute portfolio strategies in production.
- **Simulator Trading Nodes**: Run accelerated backtesting across different time frames (1 month, 3 months, 6 months, 1 year) using a built-in matching engine. Results determine which assets are eligible for live trading.
- **Control Server**: Oversees portfolio states, enforces spending rules by time-of-day, and coordinates all algorithmic logic.



Supporting Infrastructure

The infrastructure includes additional supporting servers and services:

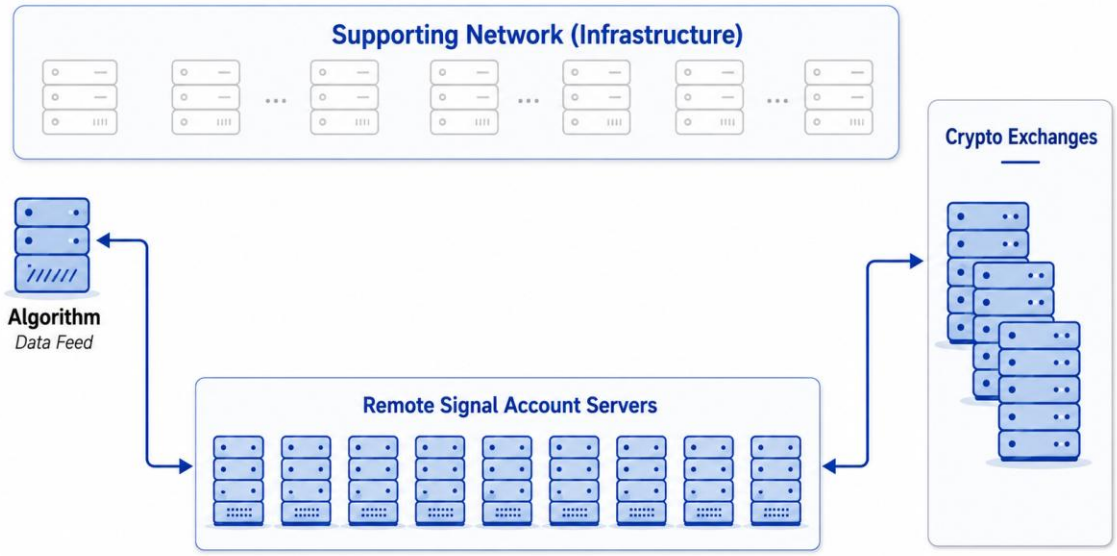
- **HAProxy Load Balancers** for distributing WebSocket and data traffic.

- **VPN Concentrators** for secure signal-server communication.
- **Kafka Brokers** for reliable message delivery and system decoupling.
- **Redundant Systems** to ensure fault tolerance and uninterrupted operations.

Signal Accounts

The Signal Accounts model provides lightweight access for external users (e.g., family, friends, or beta testers). Thin-client devices (HP T520s) connect via VPN and run stripped-down versions of the algorithm. Key features include:

- **WebSocket Integration**: Signal server software receives buy signals from a WebSocket cluster.
- **Local Decision Logic**: Signal server software validates trades against portfolio state, spending limits, and settings.
- **Security**: API keys and user credentials are stored only on the Signal server devices, never on central servers.



Data Feed Nodes

Non-trading nodes run the same algorithms as live trading but with fixed virtual balances. Their purpose is to generate consistent buy/sell signal data:

- Execute all trading pairs for a given algorithm on a single server.
- Stream buy/sell data to Kafka servers, which are consumed by the WebSocket cluster.
- Feed signal servers with real-time trading signals.

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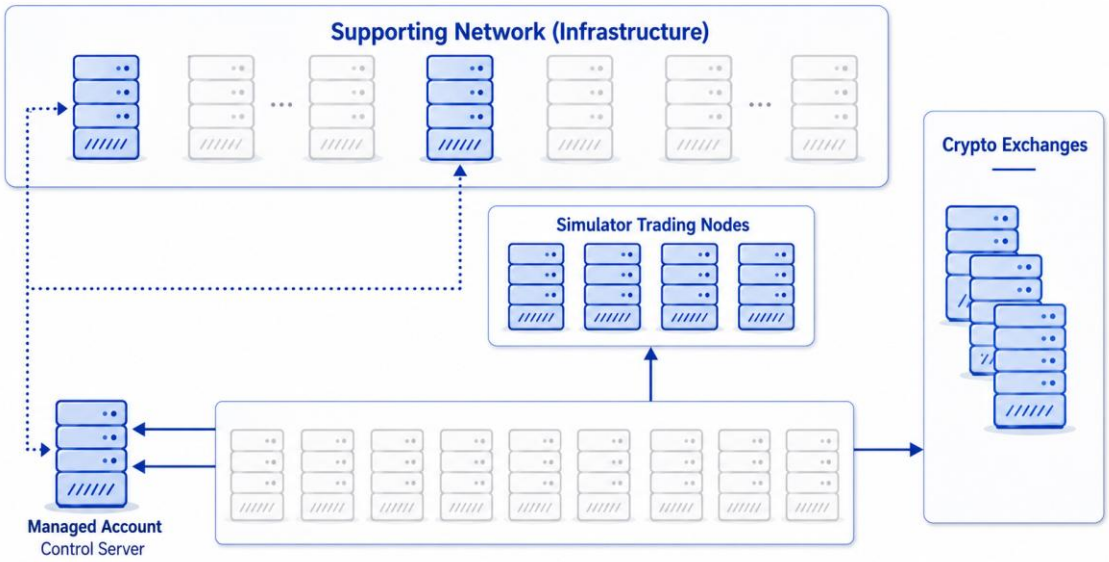
Managed Accounts (Private Mandates)

The Managed Accounts (Private Mandates) model delivers institutional-grade precision to external partners. It includes a dedicated Managed Account Control Server, which mirrors the oversight of the main Control Server but tailors execution to each private mandate:

- **Portfolio Simulation**: Creates virtual balances and runs backtesting jobs tailored to the financial state of each mandate.
- **Shared Data Feeds**: Leverages non-trading nodes for shared buy/sell signals where possible, ensuring efficient support across all mandates.
- **Local Execution**: Runs algorithm processes locally, ensuring precise management for each managed account.



Security Model

Security is a foundational principle of the infrastructure:

- API keys are stored exclusively on managed account devices.
- VPN tunnels encrypt all external communications.
- Strict separation of live trading, simulation, and mandate operations.

- Adaptive Circuit Breaker ensures capital preservation during overheated markets while protecting mandate and portfolio capital.

Conclusion

This infrastructure provides a robust foundation for algorithmic crypto trading. It is secure, scalable, and capable of supporting diverse strategies while protecting mandate and portfolio capital. The modular design allows for expansion into institutional-grade managed services while maintaining strict risk controls.