

Abstract

Liquidity.io provides a complete white-label digital securities platform for broker-dealer partners. Partners connect via FIX Protocol, REST API, or WebSocket and receive full access to: equity and options order execution with multi-leg strategy support, on-chain settlement with sub-second finality, KYC/AML compliance, margin and cash management, crypto trading, and regulatory reporting (CAT/CAIS). This document describes the integration architecture, available services, options trading capabilities, and the operational model for white-label deployments. All trading executes on the Liquid EVM with on-chain settlement, post-quantum cryptographic guarantees, and FHE-encrypted institutional privacy.

Contents

1 Platform Overview	2
2 Integration Architecture	2
2.1 Connection Methods	2
2.2 System Architecture Diagram	2
3 Services Available to Partners	2
3.1 Liquidity.io Provides	2
3.2 Back-Office Operations	3
4 Options Trading	4
4.1 Multi-Leg Strategy Support	4
4.2 Options Architecture	4
4.3 Options Contracts (On-Chain)	5
4.4 Options Approval Levels	5
4.5 Margin Calculation for Multi-Leg Strategies	5
4.6 Multi-Leg Execution Flow	5
5 On-Chain Settlement	5
6 Crypto Module	6
7 FIX Protocol Integration	6
7.1 Supported Messages	6
7.2 Multi-Leg FIX Orders	6
7.3 FIX Message Flow	7
8 ACAT Transfer Support	7
9 Regulatory Reporting	7
9.1 CAT/CAIS	7
9.2 Customer Reporting	7
10 White-Label Deployment	7
10.1 What Partners Get	7
10.2 Operational Model	8
10.3 White-Label Deployment Model	8
11 Security	8
12 Getting Started	8

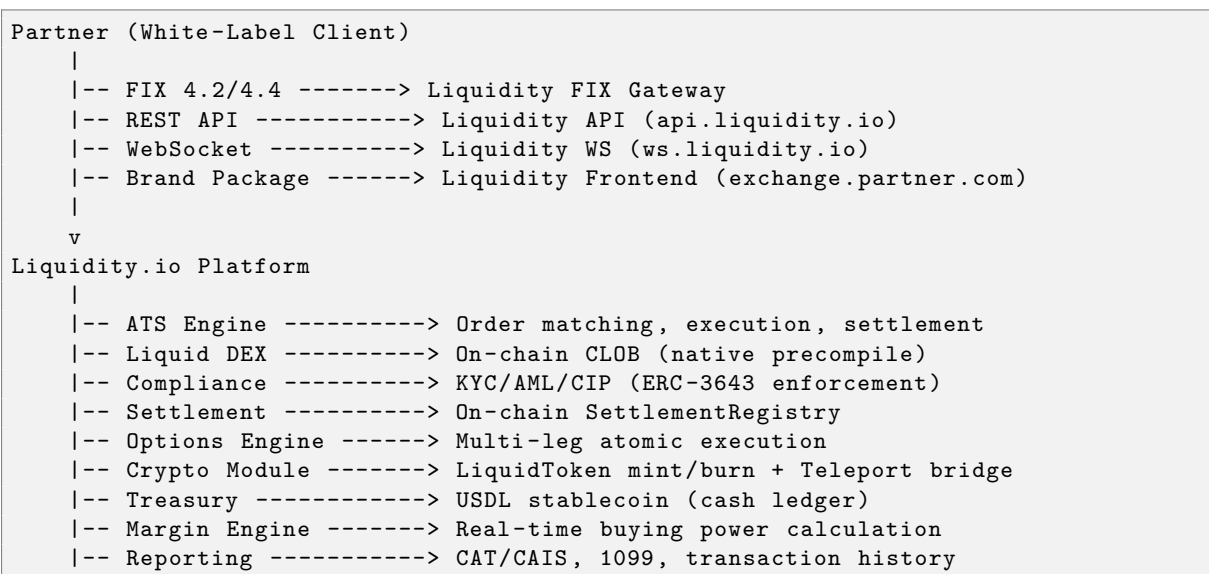
1 Platform Overview

Liquidity.io is a SEC-registered Alternative Trading System (ATS), broker-dealer, and transfer agent operating a sovereign L1 blockchain (Liquid EVM) with native DEX, 12,569 listed securities, and institutional-grade options trading.

White-label partners receive:

- Full exchange frontend (web + mobile), customizable via brand package
- FIX 4.2/4.4 gateway for OMS integration
- REST and WebSocket APIs for order management, market data, and account operations
- On-chain settlement with regulatory audit trail
- KYC/AML/CIP compliance via integrated identity platform
- Options trading with 9 multi-leg strategy types
- Crypto trading (BTC, ETH, SOL) via on-chain LiquidTokens
- Margin, cash, and buying power calculation
- CAT/CAIS regulatory reporting
- ACAT transfer support for customer account migration

2 Integration Architecture



2.1 Connection Methods

2.2 System Architecture Diagram

Figure 1: Liquidity.io platform architecture: three-layer stack from client devices through execution to on-chain settlement.

3 Services Available to Partners

3.1 Liquidity.io Provides

1. **Onboarding** — Mobile + desktop KYC/CIP, document verification, eSign, accreditation checks. Fully white-labeled.

Protocol	Use Case	Details
FIX 4.2/4.4	OMS integration	Standard FIX messages for NewOrderSingle, ExecutionReport, OrderCancelRequest. TLS + CompID authentication.
REST API	Full platform access	65+ endpoints covering orders, positions, accounts, options, compliance, reporting. Bearer JWT via OAuth 2.1.
WebSocket	Real-time streaming	Order book, trade executions, position updates, market data. Binary (ZAP) or JSON.
Brand Package	Frontend customization	npm package overrides logos, colors, legal text. Deploy as <code>exchange.partner.com</code> .

2. **Funding & Money Movement** — ACH, wire, card deposits. On-chain USDL settlement. Real-time balance tracking.
3. **Equity Order Entry** — Market, limit, stop, stop-limit orders with regulatory snap quote verification and best execution.
4. **Options Order Entry** — Single-leg and multi-leg strategies (see Section 4). Approval levels, buying power checks, margin requirements.
5. **Quote Agreements** — Regulatory agreements served during onboarding. Options disclosure, margin agreement, arbitration.
6. **Crypto Trading** — BTC, ETH, SOL via on-chain LiquidTokens (BTCL, ETHL, SOLL). Instant settlement.
7. **Notifications** — Push notifications, email, SMS, webhooks for trade confirmations, account alerts, corporate actions.
8. **MFA** — WebAuthn (FIDO2), TOTP, Face ID, SMS. Configurable per partner.
9. **Broker View** — Admin portal for partner operations team. View and trade on behalf of clients. Compliance dashboard.
10. **FIX Protocol Gateway** — Translate partner OMS messages to Liquidity.io execution engine. Full session management, heartbeat, sequence recovery.
11. **Margin & Cash Calculation** — Real-time buying power, Reg T margin, portfolio margin, options margin with spread credit.
12. **Market Data** — Real-time quotes, NBBO, option chains, Greeks, historical data. Snap quote for regulatory compliance.

3.2 Back-Office Operations

1. **Order Management System** — Full OMS: order routing, execution lifecycle, trade validation, risk controls. On-chain settlement.
2. **Profile Management** — Customer profile CRUD, account type changes, beneficiary updates.
3. **Document Management** — Tax forms, account statements, trade confirmations, regulatory filings.
4. **ACAT Transfers** — Automated Customer Account Transfer. Incoming and outgoing. NSCC/DTCC integration.
5. **Worthless Security Management** — Automated worthless equity write-off with on-chain token burn.
6. **CAT/CAIS Reporting** — Consolidated Audit Trail and Customer Account Information System. Generated from on-chain SettlementRegistry.
7. **Quote Subscriptions** — Per-customer market data entitlements. UTP, OPRA, delayed/real-

time tiers.

8. **Database Management** — On-chain = source of truth. Partner gets read-only API access to settlement history, positions, balances.

4 Options Trading

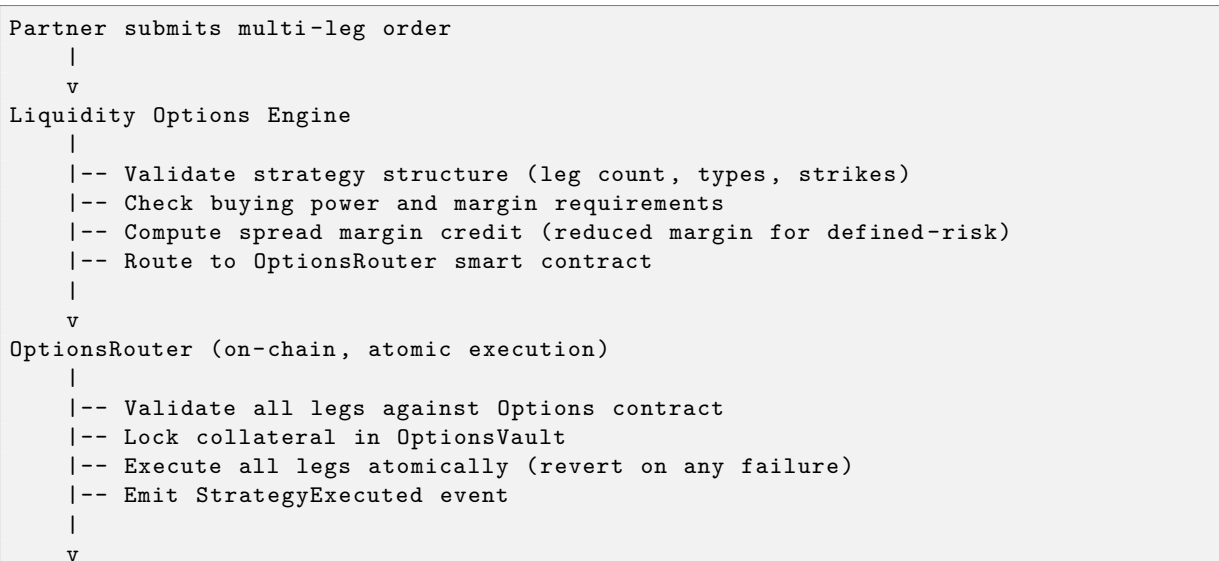
4.1 Multi-Leg Strategy Support

Liquidity.io supports 9 multi-leg options strategies, all executed atomically on-chain. If any leg fails validation or execution, the entire order reverts. No partial fills on multi-leg orders.

Strategy	Legs	Description
Vertical Spread	2	Same type, same expiry, different strikes. Bull/bear call or put spread.
Iron Condor	4	Bull put spread + bear call spread. Defined risk, range-bound strategy.
Butterfly	3-4	Buy low strike, sell 2x middle, buy high. Low-cost directional bet.
Straddle	2	Same strike, one call + one put. Volatility play.
Strangle	2	Different strikes, one call + one put. Cheaper volatility play.
Collar	2	Long put + short call (or reverse). Hedging strategy.
Calendar Spread	2	Same strike, different expiries. Time decay play.
Iron Butterfly	4	Straddle at middle strike + wings. Defined risk.
Custom	2-4	Any combination. No structural validation. Partner-defined.

Table 1: Supported multi-leg options strategies. All execute atomically on-chain.

4.2 Options Architecture



```

SettlementRegistry records trade
|
v
Partner receives ExecutionReport (FIX) or webhook

```

4.3 Options Contracts (On-Chain)

Contract	Role
Options.sol	Core options: create, exercise, expire. European and American style.
AmericanOptions.sol	American-style early exercise with dividend-adjusted pricing.
OptionsRouter.sol	Multi-leg atomic execution. Validates strategy structure, computes aggregate margin, executes all legs in one transaction.
OptionsVault.sol	Collateral management. Holds margin deposits, computes spread margin credit for defined-risk strategies.
ComplianceGate.sol	Options approval levels (1–4). Enforces strategy restrictions per investor accreditation and experience.

4.4 Options Approval Levels

Level	Strategies Allowed	Requirements
1	Covered calls, cash-secured puts	Basic account, no margin
2	Long calls and puts	Options agreement signed
3	Spreads (vertical, calendar, butterfly)	Margin account, \$2K minimum
4	Naked writing, iron condors, custom	Full margin, \$25K minimum, experience

4.5 Margin Calculation for Multi-Leg Strategies

For defined-risk strategies (verticals, iron condors, butterflies), the margin requirement is the maximum loss of the strategy, not the sum of individual legs:

$$\text{Vertical Spread Margin} = |\text{Strike}_{\text{long}} - \text{Strike}_{\text{short}}| \times \text{Contracts} \times 100 \quad (1)$$

$$\text{Iron Condor Margin} = \max(\text{Put Spread Width}, \text{Call Spread Width}) \times \text{Contracts} \times 100 \quad (2)$$

$$\text{Butterfly Margin} = \text{Net Debit} \times \text{Contracts} \times 100 \quad (3)$$

This provides significant capital efficiency compared to margining each leg independently.

4.6 Multi-Leg Execution Flow

5 On-Chain Settlement

All trades settle on the Liquid EVM with sub-second finality:

Figure 2: Multi-leg options execution flow. All legs execute atomically on-chain via the Option-sRouter contract.

1. Partner submits order via FIX or REST API
2. Liquidity.io ATS matches the order
3. Execution occurs on the Liquid DEX (native CLOB precompile)
4. SecurityToken transfers atomically with USDL settlement
5. SettlementRegistry records trade UUID \leftrightarrow on-chain tx hash
6. Partner receives ExecutionReport with settlement proof

Key property: Settlement is T+0, not T+1 or T+2. The trade is final the moment the block is confirmed (~ 2 seconds). No clearing house. No counterparty risk. The blockchain is the clearinghouse.

6 Crypto Module

Partners receive integrated crypto trading alongside equities and options:

Asset	On-Chain Token	Custody	Settlement
Bitcoin	BTCL	MPC 2-of-3 threshold	Instant (on-chain)
Ethereum	ETHL	MPC 2-of-3 threshold	Instant (on-chain)
Solana	SOLL	MPC 2-of-3 threshold	Instant (on-chain)

Crypto assets are bridged via the Teleport protocol, secured by Quasar consensus with post-quantum finality guarantees.

7 FIX Protocol Integration

7.1 Supported Messages

FIX Message	Tag	Direction
NewOrderSingle	D	Partner \rightarrow Liquidity
OrderCancelRequest	F	Partner \rightarrow Liquidity
OrderCancelReplaceRequest	G	Partner \rightarrow Liquidity
ExecutionReport	8	Liquidity \rightarrow Partner
OrderCancelReject	9	Liquidity \rightarrow Partner
NewOrderMultileg	AB	Partner \rightarrow Liquidity
MultilegExecutionReport	AC	Liquidity \rightarrow Partner
MarketDataRequest	V	Partner \rightarrow Liquidity
MarketDataSnapshotFullRefresh	W	Liquidity \rightarrow Partner
MarketDataIncrementalRefresh	X	Liquidity \rightarrow Partner

7.2 Multi-Leg FIX Orders

Multi-leg options use the FIX `NewOrderMultileg` (tag AB) message:

```
8=FIX.4.4|35=AB|49=PARTNER|56=LIQUIDITY|
55=IBIT| # Underlying
654=IRON_CONDOR| # Strategy type
555=4| # Number of legs
```

```

600=IBIT240419P00035000|604=1| # Leg 1: Buy put 35
600=IBIT240419P00037000|604=-1| # Leg 2: Sell put 37
600=IBIT240419C00042000|604=-1| # Leg 3: Sell call 42
600=IBIT240419C00044000|604=1| # Leg 4: Buy call 44
38=10|54=1|40=2|44=1.50| # 10 contracts, buy, limit $1.50

```

7.3 FIX Message Flow

Figure 3: FIX 4.4 message flow: order submission through execution and settlement confirmation.

8 ACAT Transfer Support

Liquidity.io supports automated customer account transfers per FINRA Rule 11870:

- **Incoming ACAT:** Customer transfers account from another broker to partner’s Liquidity.io instance. Securities tokenized on arrival.
- **Outgoing ACAT:** Customer transfers account from partner to another broker. On-chain tokens burned, shares released from custody.
- **Partial Transfer:** Transfer specific positions (e.g., only IBIT holdings).
- **Timeline:** Standard 3-day ACAT window. On-chain settlement is instant once transfer is approved by NSCC.

9 Regulatory Reporting

9.1 CAT/CAIS

All trades are recorded in the on-chain SettlementRegistry, which provides:

- Trade UUID ↔ on-chain transaction hash mapping
- Immutable execution timestamps (block timestamp)
- Complete order lifecycle (new, partial, filled, canceled)
- Signer addresses with role metadata

Liquidity.io generates CAT-compliant reports in FINRA’s required format, derived directly from on-chain data. No reconciliation needed—the chain is the audit trail.

9.2 Customer Reporting

- Monthly account statements
- Trade confirmations (real-time)
- 1099-B (capital gains), 1099-DIV (dividends), 1099-INT (interest)
- Cost basis reporting
- Options assignment/exercise notices

10 White-Label Deployment

10.1 What Partners Get

1. **Branded Frontend** — `exchange.partner.com` with partner’s logo, colors, legal entity. Mobile + desktop.
2. **Branded Admin Portal** — `admin.partner.com` for operations team.
3. **Dedicated API Keys** — Partner-scoped authentication via OAuth 2.1.

4. **FIX Session** — Dedicated CompID for OMS integration.
5. **Compliance Dashboard** — Partner-scoped KYC status, accreditation tracking.
6. **Reporting Portal** — Partner-scoped trade history, statements, tax forms.

10.2 Operational Model

Function	Responsibility	Provider
Customer onboarding	Partner brands, Liquidity executes	Liquidity.io
Order execution	Partner submits, Liquidity matches	Liquidity.io
Settlement	On-chain, T+0	Liquidity.io (Liquid EVM)
Custody	Non-custodial (MPC 2-of-3)	Liquidity.io
Compliance	Shared (partner + Liquidity)	Liquidity.io platform
Customer support	Partner (Tier 1), Liquidity (Tier 2)	Shared
Regulatory filings	Liquidity.io (as ATS/BD/TA)	Liquidity.io

10.3 White-Label Deployment Model

Figure 4: White-label deployment model: multiple partners share the Liquidity.io platform and Liquid EVM chain.

11 Security

- **Post-quantum cryptography:** ML-DSA-65 (FIPS 204), Ringtail lattice threshold
- **MPC custody:** 2-of-3 threshold signatures (CGGMP21). No single point of compromise
- **ERC-3643 compliance:** On-chain transfer restrictions on all securities
- **FHE privacy:** Encrypted order flow for institutional clients
- **OAuth 2.1 + PKCE:** All API authentication
- **WebAuthn:** Hardware-bound MFA for all accounts

12 Getting Started

1. **Contact** — sales@liquidity.io or your account representative
 2. **Brand Package** — Provide logo, colors, legal entity name
 3. **FIX Certification** — Test FIX session on UAT environment
 4. **API Keys** — Receive production OAuth credentials
 5. **Go Live** — Branded exchange deployed at `exchange.partner.com`
- Typical integration timeline: 2–4 weeks from kickoff to production.