COSMEX Project Close-out Report

Project Identification

Field	Value
Project Name	COSMEX - Cardano L2 Order Book Exchange
Project Number	1100102
Project Manager	Alexander Nemish
Start Date	March 11, 2024
Completion Date	November 26, 2025
GitHub Repository	https://github.com/lantr-io/cosmex

KPI Analysis

Challenge KPIs

KPI	How Addressed
Scalability	Implemented L2 state channels enabling off-chain trading with on-chain settlement, reducing mainnet congestion
Transaction Cost Reduction	Off-chain order matching reduces per-trade fees; only channel open/close/balance requires on-chain transactions
Open Source Delivery	Full codebase published under open source license on GitHub
Technical Documentation	Comprehensive Whitepaper and Litepaper published

Project KPIs

KPI	Status	Evidence
Smart Contract Implementation	Completed	CosmexValidator.scala - 4-phase state machine with 7 redeemers
PoC Exchange Server	Completed	WebSocket server with real-time order matching
On-chain Channel Operations	Completed	Verified transactions on Cardano Preprod testnet

KPI	Status	Evidence
Test Suite	Completed	Property-based and unit tests in `/src/test/scala/cosmex/`

Performance Summary

Key Achievements

1. State Channel Smart Contract

- Implemented 4-phase state machine: Open → SnapshotContest → TradesContest → Payout
- Ed25519 signature verification for snapshot authentication
- Balance preservation invariants enforced on-chain
- Trade execution validation with price-time priority

2. Off-Chain Exchange Implementation

- WebSocket API for real-time trading
- Limit order support (BUY/SELL) with automatic matching
- Multi-client channel management
- Snapshot signing protocol between clients and server

3. On-Chain Verification

- Alice's channel opening: tx/56f68c24. . .
- Bob's channel opening: tx/302c1584. . .

Impact

COSMEX demonstrates a viable path for Cardano L2 order book exchanges with:

- **Zero slippage**: Centralized matching without AMM price impact
- **MEV protection**: No front-running possible in private channels
- **Non-custodial**: Users retain cryptographic control; can always withdraw via contestation
- **Provable solvency**: On-chain state machine guarantees fund availability

Community Value

This project advances Cardano's L2 ecosystem by providing an alternative to Hydra that is:

- Simpler to deploy (star topology vs. full mesh)
- More flexible (users join/leave anytime without unanimous consent)
- Lower operational burden (no full node requirement for clients)

Documentation & Links

Source Code

- **Repository**: https://github.com/lantr-io/cosmex

Technical Documentation

- Whitepaper | PDF
- Litepaper | PDF

Demo

- **Trading Demo Video**: https://www.youtube.com/watch?v=A7XQOaOktvQ

Close-out Video

https://www.youtube.com/watch?v=sBm4BxZp5P4

Future Plans

- Mainnet deployment with production-grade infrastructure
- Integration with existing Cardano wallets
- Additional trading pairs and order types
- Community partnerships for liquidity provision