Anton Kundenko

Principal Systems Engineer • Architect of High-Performance Database Systems • Programming Language Creator

Creator of two original database systems and programming languages adopted in production at **Lynx Trading Technologies** — replacing kdb+ infrastructure with 7-figure annual savings across hundreds of instances. Author of **Rayfall** and **O**, two purpose-built languages for high-performance analytical computing.

hetoku.com | github.com/singaraiona | LinkedIn

SUMMARY

Principal systems engineer and programming language creator with **18+ years** of experience building performance-critical infrastructure. Created two original database systems — **RayforceDB** and **ThePlatform** — each with its own purpose-built programming language (**Rayfall** and **O**), now in production at **Lynx Trading Technologies** powering real-time analytics, order routing, and risk management across hundreds of instances. These systems replaced incumbent kdb+ infrastructure, delivering **7-figure annual cost savings** while handling the same mission-critical financial workloads. Deep expertise in SIMD vectorization, columnar storage design, language runtime implementation, and low-latency systems architecture.

ORIGINAL CONTRIBUTIONS

RayforceDB — Creator & Sole Architect

2020 — Present · rayforcedb.com

Original SIMD-first columnar analytical database (<1MB binary, zero dependencies) with Rayfall — an original Lisp-like array language for vectorized analytics. Created independently; subsequently sponsored by Lynx Trading Technologies for production adoption.

- Designed and implemented a novel database architecture from scratch in pure C: SIMD-vectorized operators (AVX2/NEON), cache-aware columnar layouts, mmap-based storage, and custom memory management.
- Created the Rayfall language: a composable, Lisp-like query language with first-class vectors, tables, dictionaries, temporal types, and a comprehensive type system — offering an alternative paradigm to SQL and kdb+'s q for analytical workloads.
- Built a complete ecosystem: core engine, Python bindings (DataFrame API), Rust bindings, WebAssembly runtime, VS Code extension with REPL, benchmarking suite, and documentation.
- Adopted by Lynx Trading for production financial analytics — Lynx sponsored continued development based on the system's performance advantages over incumbent solutions.

Rayfall language | Pure C | SIMD (AVX2/NEON) | Columnar | <1MB / zero deps | MIT licensed | Cross-platform

ThePlatform — Creator & Lead Architect

2016 — Present · theplatform.technology

Columnar time-series database and real-time analytics stack created for **Lynx Trading Technologies**, featuring the original O programming language — a vector language inspired by APL/k with first-class tables, async reagents, and join-calculus concurrency.

- Designed and implemented a complete database system with its own programming language, replacing Lynx's kdb+/q infrastructure for real-time market data, risk analytics, and order flow processing.
- Created the O language: vector-oriented with nanosecond timestamps, streaming pub/sub, pattern matching, and declarative concurrency — purpose-built for financial time-series workloads.
- Built async communication reagents (TCP/UDP/WebSocket/IPC/TLS), plugin architecture, and standard library enabling Lynx to consolidate multiple vendor tools into one platform.
- Deployed across hundreds of production instances at Lynx, contributing to 7-figure annual savings by eliminating kdb+ license costs and reducing operational complexity.

O language | Columnar DB | Time-series | Rust | Real-time streaming | kdb+ replacement

TeideDB — Creator & Lead Architect

2024 — Present · teidedb.com

Analytical SQL engine / embedded analytics runtime extending the Rayforce ecosystem with a modern SQL interface over a vectorized, in-process execution model.

- Vectorized operators and optimizer-oriented architecture for fast analytical workloads.
- Designed for agent-driven analytics pipelines and interactive reporting over columnar data.

SQL | Vectorized execution | Embedded / in-process | C

FOCUS

SPECIALIZATION

Database systems architecture • Programming language design • SIMD-vectorized execution engines

DOMAINS

Financial analytics • Real-time trading systems • Time-series • Embedded analytics

APPROACH

Original from-scratch designs with zero dependencies, measurable performance, and production-grade reliability

TECHNICAL SKILLS

ORIGINAL LANGUAGES CREATED

Rayfall | O language

IMPLEMENTATION LANGUAGES

C (C17) | Rust | Python | k/q (kdb+) | Lisp/Scheme

PERFORMANCE

SIMD (AVX2/NEON) | Profiling (perf) | Cache optimization | Zero-copy | Memory layouts

DATABASES

Columnar storage | Vectorized execution | Query runtimes | Index structures | Time-series

SYSTEMS

Linux | ARM | mmap I/O | Concurrency | Lock-free

TOOLING

Git | Make/CMake | Sanitizers | Benchmarks | CI

INDUSTRY ADOPTION

PRODUCTION USE

Hundreds of instances at Lynx Trading Technologies powering real-time analytics, risk management, and order routing

COST IMPACT

7-figure annual savings by replacing kdb+ licensing and consolidating vendor infrastructure

OPEN SOURCE

Teidelum — Creator & Lead Architect

2025 — Present · lum.teidedb.com

Open-source knowledge infrastructure built on the Teide columnar engine — syncs work tools, indexes content, and serves data to AI agents via MCP and applications via REST.

- BM25-ranked full-text search, SQL analytics, graph traversal; dual API (MCP + REST).
- Single Rust binary, zero cloud dependencies, incremental sync from Notion/Zulip/databases.

Rust | MCP | Full-text search | SQL | MIT licensed

AXL DB

2021 — Present · axl-db.com

Ultra-compact (<1MB core) zero-dependency vector database for deterministic-latency workloads (HFT, edge analytics, embedded ARM/x86).

Vector DB | <1MB core | AVX2/NEON

hyperbridge

Open Source · GitHub

Lock-free multi-producer/multi-consumer unbounded channel with async support in Rust.

Rust | Lock-free | Concurrency

EXPERIENCE

Principal Systems Engineer & Architect of High-Performance Database Systems

2013 — Present

Lynx Trading Technologies

- Created **ThePlatform** (2016) — a columnar time-series database and the **O programming language**, replacing Lynx's kdb+/q infrastructure for real-time market data, risk analytics, and order flow processing.
- Created **RayforceDB** (2020) — an original SIMD-first columnar database and the **Rayfall language**; independently developed, then sponsored by Lynx for production adoption and continued development.
- Delivered **7-figure annual cost savings** by eliminating kdb+ licensing and consolidating multiple vendor tools into two purpose-built systems deployed across **hundreds of production instances**.
- Built low-latency trading infrastructure, market-data processing pipelines, and real-time analytics systems for US equity markets.

Lead Engineer, Project Lead

2012 — 2013

Samsung Electronics Ukraine R&D

- Led OS virtualization work on ARM Cortex-A15; implemented TrustZone security extensions and DRM systems.
- Delivered low-level platform software integrating kernel, security, and hardware-software boundaries.

Embedded / Systems Developer

2007 — 2012

TranSat • Technotrade

- Built embedded systems (smart house, voting, CCTV, parking control) and POS/payment terminal software.
- Developed transaction-critical systems with strong reliability requirements.

EDUCATION

Specialist Degree (Master-level) — Automation & Computer-Integrated Technologies

Donbass State Engineering Academy • 2001 — 2006

Automation engineering foundation: embedded systems, computer-integrated technologies, and systems programming.

RayforceDB, TeideDB, Teidelum, hyperbridge — MIT licensed
github.com/singaraiona

LANGUAGES

English (professional) • Russian (native) • Ukrainian (fluent)