Timothy Banks

Principal Engineer — Blockchain | High-Performance Systems | C++
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SUMMARY

Principal Engineer with 25+ years of experience delivering high-performance distributed systems across blockchain platforms, custody systems, consensus protocols, developer tooling, GIS engines, UAV video systems, runtime infrastructure, and defense applications.
Expert in **C++11/14/17/20/23**, WASM internals, compiler/LLVM tooling, consensus protocols (PBFT/Autobahn, CometBFT, Concord-BFT), EOSIO, EVM execution, and Bitcoin PoW.
Known for:

- Solving deep technical problems quickly
- Leading major architectural redesigns
- Creating tooling that accelerates entire engineering orgs
- Raising engineering standards through rigorous code-review culture

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CORE COMPETENCIES

Languages: C++11/14/17/20/23, C, Python, Java
Blockchain: PBFT/Autobahn, CometBFT, Concord-BFT, EOSIO/DPoS, EVM, WASM, Bitcoin PoW
Tooling: LLVM/Clang AST, static analyzers, WASM coverage, VM internals
Systems: High-throughput runtimes, MPC signing, consensus correctness
GIS: Raster/vector pipelines, terrain algorithms, projections, OpenGL
Leadership: Review culture, architecture ownership, mentoring

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NOTABLE SYSTEMS & PROJECTS

- **Patent-pending SQL→KV semantic mapper** for blockchain data queries
- **WASM VM synchronous contract-call capability**

- **Hardhat cheatcode RPC support** (Somnia; >7,000 tests passed)
- **WASM gcov/lcov coverage support** (longstanding org-wide blocker solved)
- **macOS-native EOSIO toolchain** (eliminated Docker/VM dev dependency)
- **DoD GIS engine beating ArcObjects/FalconView** on limited hardware
- **UAV low-bandwidth video-streaming system** for iOS
- **Chromalyzer** 2D/3D color engine w/ full color-space conversions
- **Photosphere** co-founder — later acquired by Chameleon Power

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EDUCATION

Purdue University

- **M.S. Mathematics**
- **B.S. Computer Science**
- **B.S. Information Systems**

EXPERIENCE

Somnia Protocol — Principal Protocol Engineer

2025 – Present

- Principal engineer for C++ EVM-compatible L1 blockchain using Autobahn PBFT consensus.
- Added **full Hardhat cheatcode RPC support**, enabling protocol-level test compatibility with >7,000 Hardhat tests.
- Designed decentralized **HTTP-outcall oracle network** performing consensus-verified off-chain requests for smart contracts.
- Implemented protocol-level hardening: DDoS mitigation, validator-sanity rules, deterministic execution guarantees.
- Promoted **deep, non-rubberstamped code-review culture** across the engineering teams.

Bullish (Block.one) — Principal Software Engineer, Custody

2023 – 2024

- Led custody architecture across MPC signing, WASM execution, smart contracts, cross-chain integrations, and state machines.
- Delivered custody system under **fixed funding-dependent launch deadline**, despite shrinking team size.
- Led complete redesign of the custody smart-contract architecture → achieved:
  - All future business requirements handled **without additional contract engineering**
  - Near-zero bugs and minimal triage load
- Created **Clang AST-based static analyzers** catching upgrade-breaking contract patterns.
- Implemented **WASM gcov/lcov coverage support**, enabling real test coverage for the first time.
- Added **WASM VM context switching**, enabling synchronous multi-contract calls.
- Built **rapid token-listing oracle** for integration across multiple blockchains. Allowed for chain indexing, transaction creation and signing per on boarded protocol.
- Ported EOSIO to run **natively on macOS** (completed in one morning).
- Reinforced rigorous code-review culture across product and protocol teams.

Bullish (Block.one) — Lead Software Engineer, Smart Contracts

2021 – 2023

- Implemented custody-critical smart contracts in C++/WASM.
- Led team of five to deliver the 2022 Bullish Exchange launch.
- Built deterministic contract state machines supporting custody, onboarding, compliance, and lifecycle management.

Block.one — Blockchain Engineer

2020 – 2021

- Maintained EOSIO core runtime: WASM execution, storage backends, multi-index, networking, block validation.
- Integrated **RocksDB** backend.
- Advocated for deep, thoughtful code-review rigor.

Amazon — Greengrass IoT — Software Engineer

2019 – 2020

- Built offline and SCIF-compliant edge compute features.
- Migrated Python systems to 3.x; maintained C/C++ embedded interfaces.

ESRI — Principal Software Engineer

2013 – 2019

- First engineer on C++ runtime SDK rewrite.
- Built **LLVM/Clang AST binding generator** for Java, Swift, .NET, Python, Obj-C, Qt.
- Designed async operation models, rendering abstractions, and data-layer architecture.

Chameleon Power — Lead Software Engineer

2013 – 2014

- Rewrote visualization engine in modern C++ → **8× performance improvement**.
- Added interactive room recoloring, flooring changes, tile visualization, and lighting simulation.

Chromalyzer — Lead Software Engineer

2013 – 2014

- Built 2D/3D color-analysis system w/ Lab, XYZ, HSV, RGB conversions.
- Added palette-matching algorithms and coverage-optimization tools.

General Dynamics — Staff Software Engineer

2004 – 2012

- Lead engineer for high-performance **C++ GIS engine**, supporting many raster/vector formats (ASRP, CADRG, CIB, DTED, GeoTIFF, JP2, MrSID, NITF, VPF, KML, GPX, etc.) and projections (WGS84, Mercator, TM, Equirectangular, UTM, UPS, BNG) with complete MGRS grid support.
- Engine **significantly outperformed ArcObjects and FalconView** despite limited hardware.
- Implemented intervisibility, dead-ground, routing, raster pyramiding, vector-raster fusion, and OpenGL rendering.
- Designed **UAV video-streaming system** for extremely low-bandwidth networks → real-time drone feeds on iOS.

- Initiated migration from **Windows CE → Android**, solving major platform limitations.
- Built Android mapping SDK outperforming ESRI's mobile SDK.
- Contributed to ComBAT, Spartan, TiGR, TWV.

Photosphere — Co-Founder & Lead Engineer

2002 – 2004

- Built early photo-based room visualization engine supporting paint, flooring, and lighting changes.
- Acquired by Chameleon Power.

SolutionPoint — Software Engineer

1999 – 2002

- Built Web 2.0 applications using ASP.NET, JavaScript, and C++.

TECHNOLOGIES

C++11–23, C, Python, Java, Rust, LLVM, Clang, WASM, EOSIO, EVM, PBFT, CometBFT, Concord-BFT, Bitcoin PoW, OpenGL, GDAL, MPC, Kubernetes, Docker, AWS, GCP, cmake, Linux, macOS

KEYWORDS

C++11 • C++14 • C++17 • C++20 • C++23 • Modern C++ • C • Python • Java • Rust • Blockchain • Protocol Engineering • PBFT • Autobahn • CometBFT • Concord-BFT • WASM • EOSIO • EVM • Solidity Integration • Smart Contracts • MPC Signing • Consensus Algorithms • Deterministic Execution • RocksDB • LLVM • Clang • AST • Static Analysis • WASM Coverage • gcov • lcov • Developer Tooling • SQL→KV • Oracle Networks • Blockchain Indexing • High-Performance Computing • Distributed Systems • Runtime Architecture • Virtual Machines • GIS • UAV Streaming • Raster/Vector • OpenGL • Debugging • Performance Optimization • Memory Management • Multithreading • Real-Time Systems • Defense Software • Tactical Systems • Android • iOS • Edge Compute • IoT • SCIF Environments • Cloud Platforms • Kubernetes • Docker • cmake • Linux • macOS