

Thomas Gordon Lowrey IV

Principal Systems Architect | Staff Software Engineer | Strategist & Leader

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Seasoned **architect, engineer, and technical leader** with **20+ years of experience** building distributed systems, data platforms, and human-in-the-loop feedback-driven systems. I design systems where humans and machines co-create structured artifacts that drive decisions, and build the feedback loops that continuously improve those systems over time. My work spans event-driven architectures, workflow-driven data systems, and training/evaluation pipelines grounded in real-world domains (healthcare, compliance, enterprise operations), with a focus on causality, reproducibility, and scalable collaboration. I am particularly interested in applying these patterns to training intelligent systems that operate over real-world workflows and structured knowledge.

- 20+ years of application development and systems administration experience.
- 15+ years of systems architecture experience.
- 10+ years of management/leadership experience.

Core Competencies

- **Architecture & Engineering** - Enterprise and systems architecture, distributed systems, event-driven design, cloud-native solutions
- **Development & Optimization** - Application development, database tuning, performance engineering, HPC, GPU acceleration, numerical computing, memory optimization, parallel processing
- **Leadership & Strategy** - Engineering culture, team mentoring, cross-functional collaboration, technical leadership
- **Operations & Automation** - CI/CD pipelines, deployment automation, observability, failure recovery strategies, fault tolerance, capacity efficiency, cost optimization

Recent Projects and Impacts

System Transformation & Performance Engineering

- **Reduced processing time by 96%** by redesigning a monolithic data processing pipeline into an abstract system with pluggable storage and compute layers.
- **Reduced infrastructure costs by 30%** through performance tuning and cloud optimization.
- **Reduced build/deploy time by 75%** by introducing build concurrency and better IaC patterns.
- **Reduced migration effort by over 50%** by automating data pipeline code refactors.

Engineering Culture & Technical Strategy

- **Drove long-term strategic thinking** by embedding architecture as a shared discipline.
- **Mentored teams** in distributed systems, software design, and strategic decision-making, fostering a culture of clarity and long-term vision.
- **Enhanced collaboration** through formalized decision making processes, ensuring structured and well-documented decision-making.
- **Formalized documentation standards** with C4 models, PlantUML, and Diataxis framework.
- **Overhauled CI/CD pipelines**, guiding teams toward better branching strategies, deployment automation, and safer releases.

Recent Experience

Datavant (Jun 2025 - Present)

Senior Software Engineer, Team Lead, Systems Architect

Led design and development of scalable healthcare data integration frameworks, ETL pipelines, and distributed systems supporting patient data processing and Release of Information (ROI) workflows across diverse EHR platforms. Developed evaluation and QA frameworks for complex healthcare workflows, enabling systematic validation of outputs and continuous improvement of data quality and processing logic.

Key Achievements

- **Healthcare Data Integration Framework:** Designed and implemented a new abstract ETL framework, reducing duplication across 25+ EMR integrations and improving maintainability and testability.
- **Record Type Digitization (RTD):** Architected an EHR-agnostic pipeline standardizing 16+ record types with 100% unit test coverage. Built extraction, transformation, and document generation phases with pluggable SQL fetchers across NextGen, AllScripts, Meditech, Centricity, and others. Reduced integration complexity via source-to-target mapping. Delivered a template-driven system generating CCDs, progress notes, and composite record sets with partial fulfillment support.
- **Infrastructure & Developer Experience:** Created a Docker-based local dev environment (MinIO S3, Postgres/Redshift, mock APIs) enabling AWS-independent workflows. Built CI/CD pipelines and integrated Datadog monitoring for distributed systems.
- **Process & Standards:** Established RFC and ADR processes and drove adoption of HITRUST/FedRAMP-compliant logging standards.
- **Documentation & Knowledge Management:** Authored technical specifications, process flows, and implementation guides that bridge product, engineering, and compliance teams. Developed evaluation frameworks, QA processes, and integration playbooks for healthcare data systems.

Business Impact

- Reduced operational overhead by eliminating manual chart retrieval and processing.
- Increased digital fulfillment rates by enabling support for “long-tail” EHRs.
- Strengthened compliance with HIPAA, 42 CFR Part 2, and GINA through standardized validation and sensitivity filtering.
- Raised team standards for clarity, testability, and maintainability through embedded architecture and documentation practices.

Veda Data Solutions, Inc (Mar 2021 - Mar 2025)

Principal Systems Architect, Software Engineer, Leader & Mentor

Reported to Director of Engineering

Veda, based originally in Washington, DC before settling in Madison, WI, leveraged AI and machine learning to automate healthcare provider data management, enhancing accuracy, efficiency, and compliance while reducing administrative costs. I played a key role in reshaping both technical architecture and engineering culture, leading the migration from a monolith to a distributed system through performance engineering, decomposition, and abstraction.

System Transformation & Performance Engineering

- Redesigned the data processing pipeline into an abstract system with pluggable storage, serialization/deserialization, and compute layers, enabling multiple runtime architectures.
- Optimized performance and scalability by introducing threading, multiprocessing, events, and concurrency/parallelism.
- Built a vendor-agnostic observability layer for structured logging and distributed tracing.
- Taught teams profiling techniques, flame graph analysis, and compute/memory optimization.
- Mentored principal engineers about parallel computation and low-latency architectures.
- Collaborated with data scientists and AI/ML researchers to improve speed and resiliency.
- Developed patterns for resiliency, failure recovery, and graceful degradation, ensuring system stability in a complex, distributed environment.
- Designed and implemented feedback-driven training systems, including human-in-the-loop pipelines and reinforcement learning workflows, enabling models to learn from real-world data, expert feedback, and downstream product usage signals.
- Created Reactor, a domain-driven, event-sourced framework that enables modular, dynamic system design, allowing teams to model business logic with clarity while reducing complexity and improving maintainability at scale.

Engineering Culture & Technical Strategy

- Embedded architecture as a discipline, not just a role, driving long-term strategic thinking.
- Introduced C4 modeling, PlantUML, and Diataxis documentation standards.
- Implemented an RFC process, ensuring structured, well-documented decision-making.
- Overhauled our SDLC and CI/CD pipelines, guiding teams toward better branching strategies, deployment automation, and safer releases.
- Mentored engineers and peers in distributed systems, software design, and strategic decision-making, fostering a culture of clarity and long-term vision.
- Conducted technical interviews, defined requirements, and built strong engineering teams.

My contributions in architecture, scalability, observability, and process transformation have fundamentally changed how Veda approaches software engineering, decision-making, and product development. The foundations I established will continue shaping Veda's technical strategy and engineering culture.

Unite Us (Nov 2019 - Nov 2020)

Senior Architect

Reported to CTO

Unite Us, based in Manhattan, NY, builds coordinated care networks connecting health and social service providers, enabling data-driven insights to improve care delivery. I played a versatile role, reporting directly to the CTO to assess and modernize infrastructure and architecture while driving scalability and adaptability for future growth.

Infrastructure & Architecture Modernization, Engineering Force Multiplication

- Designed validation and data integrity systems that enforced correctness across distributed workflows, enabling reliable feedback on data quality and downstream system behavior.
- Introduced domain modeling and data architecture, developing statically typed, abstracted data models with automated code generation for Ruby, Go, Scala, and Python.
- Implemented a robust validation layer, enhancing data integrity and system reliability.
- Automated PostgreSQL data transfers via PL/pgSQL extensions, eliminating external orchestration dependencies.
- Accelerated Ruby-to-Python migration with automated refactoring tools, significantly improving efficiency and maintainability.
- Led infrastructure modernization and large-scale data migrations, reducing technical debt and increasing adaptability.

My contributions strengthened our technical foundation, leaving behind a scalable, high-performing data architecture capable of supporting long-term growth and adaptability.

Protean Ventures (Dec 2014 - Nov 2019)

Chief Solution Architect | Principal Software Engineer | Manager & Team Lead

Reported to CEO

Protean is a multi-tenant compliance, inspection, and data analysis platform built for an environmental compliance company in Tallahassee, FL. I architected and built the full MVP, including the backend, frontend, mobile applications, and data collection hardware, then led a globally distributed team to scale and maintain the product.

End-to-End Product Development & Leadership

- Designed and developed the end-to-end MVP architecture (web, mobile, hardware), enabling scalable expansion and long-term sustainability.
- Built human-in-the-loop workflows and analytics systems for inspection and compliance processes, enabling iterative feedback, anomaly detection, and continuous improvement of operational decisions.

Innovation in Data Collection & Processing

- Developed custom embedded data collection devices, reverse-engineering proprietary fueling systems for machine data collection and secure platform integration.
- Created a domain specific language, implementing previously unavailable machine data processing capabilities based on domain-specific technical and regulatory specifications.

Three Screens Studio (May 2013 - Jun 2017)

Senior Systems Architect | Chief Software Engineer | Manager | Team Lead
Reported to CEO

Three Screens was a software development firm in Escondido, CA, specializing in data-driven design and development for desktop, tablet, and mobile. As architect, I led the design and development of multiple applications, while also managing and overseeing multiple teams and projects in parallel.

- Managed and led multiple development teams, ensuring successful project execution.
- Designed and developed custom enterprise applications across diverse industries.
- Mentored junior developers, fostering skill growth and best practices.
- Collected and defined requirements, ensuring alignment across business and technical teams.
- Conducted technical interviews and hiring, building strong engineering teams.

Handled server administration, IT consultation, and custom hardware development, supporting operational efficiency.

Mob Science (Apr 2012 - Jan 2013)

Senior Systems Architect | Senior Software Engineer
Reported to CTO

Mob Science was a social gaming company in Carlsbad, CA. During my time, in partnership with Zynga, we were working on “Legends: Rise of a Hero” and “Panda Pop” which was later renamed to “Cookie Jam” after SGN acquisition. I developed internal company tools for creating, editing, and managing XML-based game configuration and assets, improving workflow efficiency and asset management.

Instant Checkmate (Feb 2011 - Apr 2012)

Senior Systems Architect | Senior Software Engineer | Release Manager | Server Admin | DB Admin
Reported to CEO

Instant Checkmate was a people search engine and background check service that aggregated public records and made them searchable online. I designed and maintained a hybrid dedicated and cloud-based architecture, ensuring scalability and high availability for mission-critical systems as we grew quickly due to aggressive online marketing.

- Built original POC/MVP as a contractor in 2010 before the company formalized in 2011.
- Led systems architecture, development tasks, and third-party data integration (ETL) to support business operations during rapid growth.
- Built high-scale infrastructure using F5 load balancers, NGiNX, PHP-FPM clusters, multi-master Percona (XtraDB) for optimized SQL database performance, Memcached, and Lucene/Solr.
- Managed a very high-volume Postfix mail server, sending millions of messages per month over intelligently routed GRE tunnels to maintain good IP ranking with major mailbox providers.
- Introduced DVCS (mercurial) and powerful diff/merge tooling (Araxis Merge).
- Oversaw developer workflows, ensuring smooth release management and conflict resolution.

Skills

Industry Knowledge

Agile Application Development, Agile Methodologies, Application Architecture, Application Development, Application Programming Interfaces (API), Architecture, Business Process Improvement, Cloud Computing, Communication Protocols, Cost Reduction, CQRS, Data & Information Architecture, Data Analysis, Data Integration, Data Modeling, Data Warehousing, Distributed Systems, Domain-Driven Design (DDD), Embedded Development, Event-Driven Architecture, ETL, Hardware Development, Hardware Diagnostics, HIPAA/FedRAMP/HITRUST Compliance, High Availability, High-Performance Computing (HPC), HL7 / FHIR, Information Security, Information Architecture, Leadership, Legacy Modernization, Legacy System Conversion, Linux Server Administration, Machine Learning, Management, Mentoring, Migration Projects, Network Security, OOP, Parallel Computing, Process Flow Diagrams, Process Flow Documentation, Project Management, Release Management, Reinforcement Learning, Scalability, Server Architecture, Serverless Architecture, Solution Architecture, System Architecture, Systems Improvement, Team Management, Technical Standards (RFCs, ADRs, C4 Modeling), Unified Modeling Language (UML), Unix Administration, Version Control, Web Applications, Web Crawling, Web Scraping, Web Servers

Tools & Technology

Amazon Web Services (AWS), Angular, C, CI/CD, Containerization, CUDA, Datadog, Docker, Git, Golang, Google Cloud, JavaScript, Mercurial, MicroPython, MongoDB, MQTT, MsgPack, MySQL, NGiNX, Objective-C, Open Source, Perl, PHP, PostgreSQL, Protocol Buffers, Python, PyTorch, Redis, Redshift, Ruby, S3, Scala, SerDes, Snowflake, SOAP, SQL, SVN, Terraform, TypeScript, UML, XML, ZFS

Other Skills

Abstraction, Analytics, Automation, CI/CD Pipelines, Code Refactoring, Data Warehouse Architecture, Database Administration, Disaster Recovery, Distributed Tracing, Documentation, Infrastructure as Code (IaC), Mass Mailing, Multivariate Testing, Observability, Penetration Testing, Performance Engineering, Product Development, Release Engineering, Resiliency Engineering, Reverse Engineering, RFCs, Security Auditing, Secure Software Development Lifecycle (SSDLC), Software Architectural Design, Software Design, Software Design Patterns, Software Development, Software Development Life Cycle (SDLC), Software Documentation, Technical Documentation, Technical Product Development, Technical Requirements Gathering, Web Application Security