William Louth

Principal Engineer and Product Architect

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Summary

Principal engineer and product architect with more than 30 years designing and building distributed, low-latency and observable systems. Hands-on in Java, Kotlin, Scala and Go across AWS, Kafka and Kubernetes. Architecture and engineering leadership at NN Bank, PostNL, ING and Instana, and inventor of commercial runtime products including JXInsight, Satoris and Signify, whose intellectual property Instana acquired. Most recently architected an AI companion for professional practice built on world models, situation recognition and structured human–AI collaboration.

Skills

Languages: Java, Kotlin, Scala, Go, C, Python, TypeScript

Cloud and platforms: AWS (Lambda, Step Functions, EventBridge, SQS, SNS, Kinesis, DynamoDB, RDS, S3, CDK), Kubernetes, Docker, serverless architecture

Data and messaging: Kafka, Spark, Hadoop, Flink, PostgreSQL, Cassandra, Neo4j, event sourcing, streaming data pipelines

Observability: Distributed tracing, metrics and metering, OpenTelemetry, Grafana, Prometheus, Elasticsearch and Kibana, Instana, signal and event modelling

Architecture: Distributed and event-driven architecture, domain modelling, platform engineering, digital twins, systems of systems, data migration

AI systems: Agent architecture, LLM application design, world models, situation recognition, multi-agent systems, human–AI interaction, knowledge graphs

Runtime performance: JVM instrumentation and profiling, dynamic metering, low-latency design, concurrency control, discrete-event simulation

APIs and integration: REST, gRPC, GraphQL, OpenAPI, TypeSpec, API design, canonical integration models

Reliability: Site reliability engineering, resilience engineering, application-level quality of service, service level management, chaos engineering, resource management

Product and design: Product strategy, design thinking, service design, information visualisation, conversational design, developer experience

Experience

Reducate EdTech Group

AI Product Architect | May 2026 – Present

- Designed the product and cognitive architecture for PAIR, an AI companion for professional practice centred on situational awareness and human–AI collaboration.
- Defined a reusable world model of situations, agents, context, roles, norms, tasks, place and time, with a Prepare, Act, Reflect, Feed-forward learning loop in which AI supports preparation, interpretation, reflection and follow-through.
- Built a type-driven architecture in which domain experts define situation patterns that the agent recognises and binds to live context at runtime, extended into semantic task management, persistent professional context and structured interaction through reading cards, bounded prompts and proactive proposals.

Migration and Integration Architect, Engineering Lead | Jan 2026 – May 2026

- Architected a reusable migration and integration framework for learning management systems around a canonical intermediate domain model that decouples source and target schemas and preserves business rules, relationships and data semantics.

- Designed a compiler-inspired Record, Rectify, Replay pipeline with multi-pass transformation, enrichment, cross-object validation and controlled synthesis into target APIs and database operations.
- Built traceability into the pipeline through transformation logs, identifier mapping, auditable checkpoints and post-load verification, making migrations repeatable across evolving schemas.

Lionsville B.V.

Digital Twin Architect | Apr 2025 – Dec 2025

- Worked on observability and digital twin initiatives across manufacturing, logistics, defence and retail, helping organisations design, engineer, observe and manage mission-critical systems of systems.

NN Bank

Software Architect, Engineering Lead | Jan 2024 – Dec 2024

- Served as domain architect for savings, investment and banking-assurance products within the bank's Future Ready transformation, spanning cloud architecture, API design, platform engineering and service design.
- Initiated and led design and development of the Dev$f$(x) accelerator toolkit, encapsulating serverless AWS development (queues, step functions, Lambdas and gateways) in reusable constructs that standardised delivery of business workflows, processes and services.
- Designed an agentic AI workflow integration through a Tasks OpenAPI.
- Grew the skills of solution architects, software engineers and information analysts in high-code development, systems engineering and service design.

JInspired B.V.

Founder, Principal Engineer, Product Architect | Jan 2008 – Dec 2023

Own company: the Autoletics JVM product line from 2008 to 2019, and contract engineering and architecture engagements for clients from 2015 to 2022.

Client engagements (contracts via JInspired B.V.)

Aimwel (DPG Media) | Senior Systems Engineer, Scala | Apr 2022 – Dec 2022

- Refactored the monolithic event-sourcing system of a programmatic job-advertising platform into modular Scala and ZIO components and REST and gRPC services on Kubernetes.
- Designed the Publisher API connecting the platform to social channels including LinkedIn, and advised on the move to a multi-tenant SaaS model.
- Shared operational responsibility for instrumentation, monitoring, alerting, diagnosis and service operations.
- Modelled and monitored event data flow across clients, job boards and advertising channels, and designed dashboard visualisations of money, content and audience flows.

PostNL | Solutions Architect, Engineering Lead | Oct 2020 – Oct 2021

- Migrated applications, data services and IoT storage to AWS, then expanded into architecture, engineering leadership, product design and information visualisation across three initiatives.
- Control Tower: authored a digital-twin architecture linking network topology, resource exchanges (REA(L)), system dynamics and situation assessment through an event-driven information hub, with scenes, situations, scenarios and scripts connecting operational evidence to projected states, simulated interventions and operator decisions during disruptions.
- Habitat: designed process and data integration on cooperating agents and shared graph-based workspaces using GraphQL and event streams, including migration from existing data warehouses and lakes.
- DevEx: designed conversational developer onboarding and workflow tooling on the Slack and AWS APIs.

ING | Senior Software Resilience Engineer, SRE Lead | Apr 2018 – Dec 2018

- Led the introduction of site reliability engineering practices across teams.
- Designed Java and Scala libraries for observability and controllability at the API layer (REST, Finagle and gRPC), supported by prototypes, training and architecture guidance.
- Standardised dashboards, visualisation displays and instrument naming, and scaled the metrics data stores.
- Created an education programme on resilience engineering for managers and developers through meetups and chapter talks.

Nike | Senior Scala Data Engineer | Jan 2018 – Mar 2018

- Built Java and Scala microservices and data pipelines on AWS for customer experience applications, and onboarded Java developers to Scala.

AT&T | Java EE Engineer | 2017

- Modernised Java EE services for the cloud and built their delivery pipelines.

Quby (Eneco) | Big Data Architect, Data Engineer | Dec 2015 – Oct 2016

- Led delivery of private and cloud metering pipelines for smart energy and home initiatives on Hadoop, Spark, Kafka and MQTT.
- Initiated the second-generation Kafka collection architecture and oversaw its migration from Java to Go.
- Managed the Cloudera Hadoop cluster.

Products

Autoletics | JVM product line | Jan 2008 – Jan 2019

- Designed and built a commercial JVM product family progressing from measurement to control, execution memory and simulation, used for performance engineering by enterprises including PUMA and Yapı Kredi.
- JXInsight: application performance profiling and transaction analysis with distributed tracing for the JVM.
- Satoris: adaptive multi-strategy dynamic metering for low-latency applications, including gaming and trading platforms.
- Sentris: application-level quality of service unifying activity metering, execution control and resource management in one runtime model.
- Stenos and Simz: execution recording and playback, and a discrete-event simulation engine that replays the execution behaviour and resource consumption of an entire instrumented infrastructure in near real time within a single runtime.
- Pioneered activity-based cost metering for applications, runtimes and platforms.

Instana (acquired by IBM)

Principal Engineer, Product Architect, CTO Office | Feb 2019 – Apr 2020

- Continued development of Signify after selling its intellectual property to Instana, and led the Signals API work for expressing service health across distributed services.
- Designed new API components and cost-optimised data pipelines on AWS for the SaaS product, including stores holding more than 100 billion records.
- As the second member of the CTO Office, shaped observability and monitoring product strategy over a 6 to 18 month horizon, focused on contextualisation, complexity reduction, controllability and communication. Initiated AssistiveOps.
- Encoded domain expertise in signal types that pre-classify operational evidence and expose relationships across process timescales.
- Wrote The ABC of Observability and further articles on enterprise observability engineering.

European Patent Office

Applications Operations Management, Architecture Team Lead | May 2006 – Feb 2008

- Provided ITIL expertise in change, configuration and release management, and in application and service monitoring.
- Built a software build artefact repository on the Java Content Repository API across the Jackrabbit, Day Software and eXo Platform implementations.

HP OpenView

Technical Solutions Architect, Advisor | Nov 2003 – May 2006

- Architected and built, with three engineers, a model-driven migration solution from ServiceDesk 4.5 to 5.0.
- Built a distributed WorkManager implementation that parallelised transformations across machines and JVMs for databases of hundreds of millions of records.
- Led performance and availability engineering for the CME platform across R&D and customer environments.

Inspired Consultancy Limited (Ireland)
Founder, Engineer and Designer | Feb 2000 – Oct 2003
Own company: contract architecture and engineering engagements for clients from 2000 to 2002, and the JDBInsight product in 2003.

Client engagements (contracts via Inspired Consultancy Limited)
Borland | Solutions Architect, R&D Product Architect | Jun 2000 – Dec 2002

- Resolved architecture, performance and scalability challenges for enterprise customers building on CORBA, Java and J2EE with the Borland AppServer.
- Designed AppSimulator around separate application, platform and infrastructure models, combining repeatable deployment transformations with runtime feedback and fault injection for resilience assessment.
- Initiated VisiCache, an early distributed data cache accessible from Java and C/C++ CORBA clients.

Bear Stearns, Dublin | J2EE Solutions Architect | Feb 2000 – May 2000

- Introduced J2EE technologies and development practices to the development team and benchmarked current and candidate J2EE products for performance.

Products
JDBInsight | Java transaction analysis product | Jan 2003 – Oct 2003

- Created JDBInsight, a Java transaction analysis product with performance visualisations for developers, testers and database administrators, winner of the JDJ Readers' Choice Award for Best Java Application Monitoring Tool.

Earlier experience

1994 to 2000: distributed Java and CORBA systems, network modelling, real-time finance and national health statistics.

- AT&T Unisource | Chief Architect and Lead Engineer, CORE | Jun 1999 – Jan 2000
- Hewlett-Packard and Dutchtone | Technical Advisor, IS Applications Architect (interim) | Oct 1998 – May 1999
- Case Consult | Senior Object Technology Consultant | Jan 1998 – Sep 1998
- Logica | Technical Lead, Customer Care Solutions | Jan 1997 – Dec 1997
- General Medical Services (Payments) Board, Ireland | Statistician, Applications Programmer | 1994 – 1995

Research and publications

Humainary
Founder, Computational Systems Researcher | May 2020 – Present

- Designed and built Substrates, a high-performance runtime for deterministic, ordered signal processing and state propagation: single-threaded circuits, ordered causal propagation, typed signal pathways, adaptive flow control and composable in-flight transformation, with explicit execution semantics at very high rates of local signal circulation.
- Designed Serventis, a semiotic signal model that turns operational evidence into signs, statuses, situations and projections, giving human operators and autonomous agents a shared basis for understanding and bounded intervention.
- Researches situational intelligence and human–AI collaboration, drawing on semiotics, cybernetics and perceptual control theory.

Writing and talks

- Author of the Holonic series of Seeing Systems booklets (Holonic Flow, Time, Topology, Dynamics and Control) and essays on observability, controllability, distributed systems and situational intelligence, published at humainary.io.
- About 30 conference presentations at venues including JavaOne (US and India), Velocity Europe, Cloud Connect, JAX, CMG, DevOpsDays, Jazoon and The ServerSide Symposium.