

# Volodymyr Pavlyshyn

Principal Engineer · Staff Architect · Graph Systems & Agent Infrastructure

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## PROFILE

Principal Engineer and Staff Architect with 23+ years of industry experience, including deep specialization in graph databases, agentic memory systems, Self-Sovereign Identity (SSI), and distributed knowledge infrastructure. Founding engineer at **Affinidi** (SSI / verifiable credentials) and **Mykin.ai** (privacy-first personal AI). Recognized for bridging research-level concepts — semantic spacetime, promise theory, verifiable credentials, local-first architecture — into production-grade systems. Open-source author of Factum ORM, an object-role modeling tool ([www.factum-orm.com](https://www.factum-orm.com)), and author of technical books on graph systems and AI agents. Consistent track record of shaping technical vision at the CTO/Founder level, hiring and coaching engineering teams, and delivering complex systems under constraint.

## CORE EXPERTISE

**Architecture & Systems Design** Distributed graph systems · columnar/embedded databases (Kùzu/LadybugDB) · SST ontology · bipartite knowledge graphs · HyperGraphRAG · HNSW vector search · Reciprocal Rank Fusion · local-first architecture

**Agentic & AI Infrastructure** Agent memory pipelines · semantic extraction-consolidation (FIRE) · promise-graph agent cooperation · agentic world models · multi-agent trust registries · LLM orchestration

**Identity & Trust Protocols** Self-Sovereign Identity (SSI) · DID methods (did:web, did:webvh, did:webs) · KERI · verifiable credentials · GLEIF vLEI · agent reputation systems

**Languages & Runtimes** Rust · TypeScript · Python · Go · Kotlin · Scala · C++ Zig · Clojure — pragmatic polyglot; language chosen to fit the problem

**Delivery & Leadership** Staff/Principal IC · Office of CTO · architecture review · technical hiring · R&D roadmapping · team coaching · Agile/Scrum

## SELECTED TECHNICAL WORK & PUBLICATIONS

**Factum ORM** — Creator and open-source author of Factum ORM, an object-role modelling (ORM) tool for fact-based conceptual modelling and schema generation: [www.factum-orm.com](https://www.factum-orm.com)

implementing Mark Burgess's Semantic Spacetime ontology. Bipartite reification pattern structurally identical to HyperGraphRAG's storage transform; four-channel retrieval fusing HNSW, Personalized PageRank, community detection and Text-to-Cypher via RRF.

**Selected Books (Leanpub)** — [leanpub.com/u/vpavlyshyn](https://leanpub.com/u/vpavlyshyn)

- ▶ **Temporal-Aware AI Memory: Why time is a key in a memory** — Modeling time as a first-class dimension in agent memory: bi-temporal facts, decay, recency-aware retrieval and causal ordering across episodic and semantic stores.
- ▶ **Semantic Space Time for AI Agent Ready Graphs** — Applying Mark Burgess's Semantic Spacetime ontology ( $\gamma(3,4)$ : NEAR, LEADS-TO, CONTAINS, EXPRESSES) to build agent-ready knowledge graphs with consistent semantics for retrieval and reasoning.
- ▶ **TypeDB for Edge AI Agents** — Strongly-typed knowledge graphs as the substrate for on-device agent memory: PERA modelling, polymorphic entity-relation-attributes, and SHACL-style validation at the edge.
- ▶ **Metagraph for AI Agents** — Higher-order graph structures (edges over edges, hyperedges, reified relations) for agent reasoning beyond plain triples; bipartite encoding patterns aligned with HyperGraphRAG.

**icebug-rs** — Rust bindings to Icebug (C++ graph analytics fork of NetworkKit) via the cxx crate, enabling high-performance graph analytics from Rust.

## PROFESSIONAL EXPERIENCE

Founding Engineer · Senior Staff Engineer · **Affinidi** Jul 2025 – Present

*Privacy-preserving identity and verifiable data infrastructure · founding engineer (returning)*

- ▶ Returning founding engineer; partner with CTO and founding team on technical vision and architecture for agent identity and trust protocols.
- ▶ Lead Office of CTO R&D initiatives: agent identity solutions, trust protocol specifications, agent reputation and trust registry design.
- ▶ Define and communicate agent architecture education program across the engineering organization.

### **Founding Engineer · Principal Engineer / Architect · [Mykin.ai \(Kin\)](#) Aug 2023 – Jul 2025**

*Privacy-first personal AI assistant — local-first architecture, on-device ML, sovereign data*

- ▶ Founding engineer; shaped technical vision alongside CTO from earliest stage and pioneered local-first and edge-ML stack for mobile (React Native + Turso).
- ▶ Designed and delivered core semantic memory for AI agents: personal knowledge graph with vector search and clustering, on-device.
- ▶ Established company-wide tech standards, testing strategy for non-deterministic AI systems, and agentic data pipeline architecture.
- ▶ Contributed directly to a \$2M investment round; represented technical architecture to investors.
- ▶ Drove Alpha → Beta → Production release cycles under mobile hardware and storage constraints.
- ▶ Partnered with Turso to enable vector search on mobile devices — a first for the platform.

### **Founding Engineer · Staff Engineer / SSI Architect · [Affinidi](#) Aug 2020 – Jul 2023**

*Self-Sovereign Identity platform and verifiable credentials infrastructure*

- ▶ Founding engineer on the SSI platform; active member of architecture group and Office of CTO; led cross-company architectural reviews and design decisions.
- ▶ Delivered a working COVID verifiable credentials platform from zero to live airport integration (Singapore) in four weeks.
- ▶ Led L2-level DID/Sidetree protocol support for core identity services.
- ▶ Introduced Architecture Decision Log and C4 documentation discipline across engineering.
- ▶ Performance-tuned core SDK for 10k concurrent connections; drove technical vision for new products with CTO.
- ▶ Built engineering recruitment process and technical interviewing standards.

### **Senior Engineer / Architect · [21re.de](#) Jul 2020 – Feb 2020**

*Smart geo-data platform for real-estate valuation and market analytics*

- ▶ Designed full-stack valuation system with a rule-based DSL and incremental re-computation engine.
- ▶ Introduced XState/statechart-based modelling for the frontend: ~30% faster feature delivery, significant codebase reduction.
- ▶ Built observability infrastructure (AWS OpenDistro / ELK); owned infrastructure maintenance (Docker Swarm, bare metal Linux).

### **Senior Engineer / Front-end Platform Owner · [LiveIntent](#) Feb 2020 – Nov 2018**

*AdMarTech identity graph — 3M events/minute*

- ▶ Owned high-throughput JS data-feeder services (3M events/min) and drove reliability engineering.
- ▶ Architected a high-performance tag management application (Google Tag Manager-class) with sub-millisecond execution.
- ▶ Tuned QA and deployment pipelines; full-stack delivery from React frontend to Scala backend.

### **Lead Full-Stack Engineer · [Zalando](#) Jun 2016 – Oct 2018**

*Transaction Core (order lifecycle), Loyalty Platform, Checkout — serving 40M+ customers*

- ▶ Architected and led Transaction Core (order lifecycle backend) serving the full Zalando customer base.
- ▶ Led migration of the checkout monolith to microservices (Mosaic9 architecture); improved reliability and release cadence.
- ▶ Built and led teams of 5–15 engineers; ran 24/7 support organisation including Black Friday war-room.
- ▶ Co-ordinated integration across 18+ teams (~100 developers) for loyalty programme rollout.
- ▶ Shipped real-time WebSocket services, secure payment flows, and multilingual order information pages for 14M customers.

## **Lead Engineer / Big Data R&D** · **TomTom** Mar 2015 – Jun 2016

*Geospatial & Traffic Analytics — large-scale graph data visualisation and processing*

- ▶ Designed frontend visualisation platform for geospatial and traffic big data (React + Reflux, TopoJSON/GeoJSON).
- ▶ Implemented memory-efficient GPS probe path-reconstruction algorithms in Java (graph traversal at scale).
- ▶ Prototyped traffic analytics algorithms across Python, C++, NodeJS and QGIS; owned binary big-data provider design.

## **Senior Web Developer** · **Smava.de** Sep 2014 – Feb 2015

*Consumer fintech — credit comparison and origination platform*

- ▶ Owned large-scale UX surface built on Backbone and vanilla JS; delivered desktop and mobile HTML5/CSS3 pages with measurable client-side performance gains.
- ▶ Integrated and tuned in-house Java CMS (JSP / Spring MVC); supported legacy stack while shipping new features.
- ▶ Partnered with marketing to integrate analytics and tracking infrastructure across the site.

## **Technical Consultant / Senior Web Developer** · **lieferando.de** Sep 2013 – Sep 2014

*Food-delivery marketplace — Salesforce/force.com and high-traffic web frontend*

- ▶ Tuned initial-page performance by 60% on the discount/stamp-card feature; improved client-side and integration response times across the site.
- ▶ Built a company-wide customer feedback and survey system on force.com; delivered service-console customisation for country streams.
- ▶ Set up CI/CD delivery tooling for force.com; prototyped a gamification/award system for support agents.
- ▶ Implemented mass-fax and mass-mail functionality on top of force.com.

## **Technical Consultant** · **Tquila** Sep 2012 – Sep 2013

*Salesforce consultancy — enterprise SaaS and hybrid cloud delivery*

- ▶ Delivered GIPSY — a single-page deal-flow and cross-border scheduling planner extending standard Salesforce.com functionality.
- ▶ Architected the Lab Forum platform: a Heroku-based, reusable digital-forum framework for enterprise customers.
- ▶ Built STORM — a force.com-based recruitment platform covering full HR/recruitment workflow with a cloud-side candidate experience.
- ▶ Force.com Certified Developer; hands-on Visualforce, Apex, Heroku (Rails / NodeJS / Java Spring), and JS UX work.

## **Senior / Lead Software Engineer** · **EPAM (for Credit Suisse)** Nov 2011 – Aug 2012

*Equity derivatives & exotic-risk trading platform — distributed SOA with grid computation*

- ▶ Performance-tuned WCF services on a large distributed SOA risk-management platform.
- ▶ Active member of the second-line 24/7 production support team for a live trading system.
- ▶ Maintained Apex/Oracle Database application layer and the platform's security sub-system.

## **Technical Lead / Architect** · **SoftServe** Oct 2010 – Oct 2011

*Web, SOA and SaaS security platforms — healthcare and public-sector systems*

- ▶ Led security sub-system redesign for healthcare and public-sector platforms; migration to Windows Identity Foundation and ADFS 2.0.
- ▶ Architected a personal-information management cloud product with rich object/library semantics across mixed media types.
- ▶ Delivered the laboratory-process management portal end-to-end.
- ▶ Owned team management, technical interviewing, competence audit and software estimation across multiple streams.

## **System / Cloud Solutions Architect** · **Eleks Software** May 2008 – Oct 2010

*Scalable architecture, cloud migration and large-system estimation across .NET / Azure*

- ▶ Designed scalable architecture for an MMOG game platform serving 80,000+ concurrent users across 46 countries on four continents.

- ▶ Architected an iris-recognition cloud service: migration cut hardware support cost, reduced maintenance pitstops 10×, and improved recognition latency 4×.
- ▶ Delivered a TV-box software platform unifying digital television, personal media and internet services on the living-room TV.
- ▶ Department-wide architecture auditor; led legacy-system cloud migration strategy (C++ DCOM → cloud) and large software estimations (10,000+ hours).
- ▶ Concurrently held a Project Manager role: team co-ordination, requirements management, risk management for distributed teams.

### **Software Engineer / Lead · Eleks Software** Mar 2005 – May 2008

*Shared web platform and reusable component libraries for e-government delivery*

- ▶ Designed and implemented a shared web development core platform powering 15+ e-government projects on ASP.NET 2.0–3.5 and MS SQL Server — used in mission-critical projects from 2006 onward.
- ▶ Built a unified testing process that cut development time 2× and reduced full-regression cycles to under one day (~4× faster).
- ▶ Designed and shipped a reusable client-side controls library with a flexible declarative configuration model (pure JavaScript).
- ▶ Owned web automation testing tools for UI and service auto-test; mentored JavaScript and UX developers; ran technical interviews.
- ▶ Delivered image-processing algorithms with scanner and video-camera integration.

### **Unix / Web Solutions Software Engineer · Freelance** Jan 2002 – Feb 2005

*Independent delivery across web, desktop and Unix environments*

- ▶ Web development, Win32 and Unix desktop development, and systems administration for SMB and education clients.
- ▶ Delivered e-learning platforms (Moodle-based and custom), e-commerce systems, reputation systems, accounting and small-business CMS/CRM solutions.

## **EDUCATION**

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**Master of Special Computer Systems (with Honors)** · Lviv Polytechnic National University · 2006–2008

**Bachelor of System Engineering (with Honors)** · Lviv Polytechnic National University · 2003–2006

## **LANGUAGES**

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**Ukrainian** Native   **English** C1   **German** B1   **Polish** B2+   **Russian** C2