

Aleksandr (Sasha) Lopashev

Distributed Systems | AI Infrastructure | Autonomous Systems

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Software engineer with 14+ years in distributed systems — from Indeed's global API platform (billions of requests a day) to execution infrastructure for autonomous cybersecurity agents at Pi. Current focus: making it safe and fast for agents to run real code. Side projects in machine-oriented programming models and AI-assisted formal mathematics.

WORK EXPERIENCE

Pi Security | Founding Engineer

2025 – Present

San Francisco, CA, USA

- Own platform and deployment architecture for autonomous cybersecurity agents, including autoscaling Kubernetes infrastructure for bursty, highly parallel agent workloads.
- Design the sandboxing and isolation boundaries for agents that operate on customer source code and security-sensitive workflows.
- Built hermetic local environments that reconstruct the entire product from declared inputs — complete isolation, no shared staging — so every role in the company can change and verify a real, working system and deliver much faster.
- Built a source-code synchronization system with sub-minute delivery of customers' latest code bases into scoped agentic workflows.

Ventrilo.ai | Founding Engineer

2023 – 2025

Menlo Park, CA, USA

- Built the company's GCP infrastructure from scratch: autoscaled, multi-region services delivering ~500 ms p95 autocomplete worldwide for an AI browser companion.
- Prototyped browser activity recording and replay, real-time video ingestion, and a distributed crawler that explored websites as state graphs.
- Owned backend ingestion and context processing in TypeScript and Python — real-time context gathering and RAG preparation — along with observability and infrastructure-as-code.

Indeed | Staff Software Engineer

2019 – 2023

San Francisco, CA, USA

- Technical lead for the federated GraphQL API platform: 250 services, 1,000+ clients, billions of requests a day at 40,000 peak RPS on 600+ nodes worldwide.
- Led the product API gateway migration from Google Apigee to Cloudflare end to end — research, prototypes, load testing, rollout, telemetry. Cut annual cost by 80%, with no outages after cutover for the rest of my tenure.
- Designed the gateway's authorization model with OAuth and Open Policy Agent/Rego, expressed through GraphQL's own semantics; also shipped data redaction and schema documentation.
- Drove the org-wide Apollo Federation v2 migration; mentored engineers and conducted 300+ interviews.

Indeed Japan | Software Engineer → Staff Software Engineer

2015 – 2019

Tokyo, Japan

- Built and owned an internal human-in-the-loop crowdsourcing platform that replaced spreadsheet-driven operations with automated task distribution and grading — hundreds of thousands of tasks completed, millions in estimated operational savings.
- Worked on global web-crawling and browser-based aggregation; produced the datasets and tooling data scientists used to automate more of the ingestion pipeline.
- Built a classifier over public web data that identified ~750,000 candidate sites for the discovery system.

SELECTED INDEPENDENT WORK

BHCP – Beyond Human-Centric Programming · github.com/bhcp-dev/bhcp

Language and execution-model research for software written and operated by agents rather than people: deterministic representations, explicit effects, and execution semantics you can verify.

Migaki · github.com/migaki-dev/migaki

Execution optimizer for agent workflows. Treats "which model runs which step" as an optimization problem over quality, latency, cost, and policy — portable execution graphs with evidence traces.

Beyond MatMul · github.com/alexlopashev/beyond-matmul

Experiments in computation past transformer-style dense matrix multiplication: a provenance-aware operator IR, structure recovery, and benchmarks.

RH / Lean Experiment · github.com/alexlopashev/rh-lol

AI-assisted formalization of the Riemann Hypothesis's dependency structure in Lean 4 — kernel-checked proofs only, with every unproven bridge named explicitly.

SELECTED WRITING

The Missing Primitive for an AI-Native Company · [📄 Link](#)

Capable agents need disposable, observable copies of reality where they can change a system and prove the change worked.

Crowdsourcing Became the AI Data Supply Chain · [📄 Link](#)

What a decade of human-in-the-loop data infrastructure teaches about modern AI evaluation and expert-feedback pipelines.

EARLIER WORK EXPERIENCE

Yandex | Software Engineer, Yandex.Metrica | 2014 – 2015 | Moscow, Russia

API ownership, ClickHouse collaboration, load/stress testing, and automated API regression infrastructure.

Mail.Ru Group / Games | Software Engineer | 2012 – 2014 | Moscow, Russia

Backend and game systems in Java, C++, and Perl; performance work and testing infrastructure.

GE Money Bank Center of Excellence / Mirantis | Software Engineer | 2009 – 2012 | Saratov, Russia

Enterprise helpdesk and banking batch-processing systems; improved throughput under rapidly growing data volume.

EDUCATION

Saratov State University | M.S., Mathematics / Computer Security & Cryptography | 2006 – 2012