Pascal Perrenoud

Software engineer · Rust & TypeScript · security background

Yverdon-les-Bains, Switzerland · remote
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Software engineer with an MSc in computer science (cybersecurity) and three years of research and engineering in cryptography, security and production systems. Rust first (async, unsafe, FFI), TypeScript for the web. Correctness first: tests that fail before the fix, measurements before claims. Remote, available full-time now as employee or contractor.

SKILLS

Languages	**Rust** (async/tokio, unsafe, FFI with C, WASM) · **TypeScript** (Node, React, Svelte) · C, C++ · Python, VHDL, assembly
Systems	Linux, PostgreSQL, SQLite, S3-compatible storage, Docker, CI pipelines, Prometheus metrics
Security	Secure code review, input validation at trust boundaries, applied and post-quantum cryptography, fault-injection countermeasures, protocol design

OPEN SOURCE

Turso — SQLite rewrite in Rust · PR #10895 (open, in review) Oct 2026

- Made huge-page advice on buffer-pool arenas opt-in, cutting resident memory per open database on Linux from ~2.2 MB to ~170 KB; benchmarked the trade-off and documented the switch.

mh3-rs — online server for *Monster Hunter Tri* (Wii), in Rust · github.com/mh3-rs/server 2026

- Reimplemented the game's online protocol at parity with the Python reference, checked by tests and replays of recorded sessions; quest binaries byte-identical to the reference generator, enforced in CI.
- Built NAT negotiation with a transparent relay fallback for consoles behind symmetric NAT: p99 relay latency under 10 ms against 50–80 ms for the reference.
- Validated player-supplied profiles so a crafted one can't crash other consoles; bans, admin API, health probes, Prometheus metrics; deployed publicly as a multi-arch Docker image.

Theca — self-hosted cloud storage · github.com/theca-cloud · AGPL-3.0 2026

- Rust server (axum, sqlx/PostgreSQL) with OpenAPI-documented REST API, WebDAV and content-defined chunking (FastCDC) onto S3-compatible storage; Rust client engine compiled to WASM for the SvelteKit app; CI with cargo-deny and multi-arch releases.

EXPERIENCE

Founder & engineer — Codexa, Yverdon-les-Bains 2026 – present

Independent studio: I build and operate software for clients and for my own products.

- **Feezio** — practice-management app in daily use at a physiotherapy practice: 2 therapists, ~100 patients. Scheduling calendar and assessment tracking (SvelteKit, TypeScript, MySQL/Drizzle).
- **Client website (SME)** — cut page load from ~3 s to ~0.5 s, and stopped an ongoing DDoS attack by putting the site behind Cloudflare's proxy.
- **Chapter** — real-time chat platform (TypeScript, socket.io) with a layered safety pipeline (Project Arachnid hash matching, AI triage) and offline-first client sync.
- **what2do.ch** — cultural events platform for French-speaking Switzerland: scraping and normalisation pipeline (~200 events), geographic search on OpenStreetMap data.

Master's thesis — CSEM, Neuchâtel 2025 – 2026

- Protected a cryptographic accelerator (Keccak/SHA-3, VHDL) against electromagnetic fault injection with redundancy-based countermeasures (duplication, three-share). C alongside the VHDL. Details under NDA.

Teaching & research assistant — HEIG-VD, Yverdon-les-Bains 2023 – 2025

- Teaching assistant for SLH (application security): ~60 students learning Rust, RBAC, audit logging and business-rule enforcement.
- Implemented modular arithmetic over ~240-bit composite moduli in Rust for a post-quantum threshold signature proof of concept; signature assembly went from minutes to tens of seconds.
- Co-designed asymmetric over-the-air rekeying (2DH/3DH) for CCSDS SDLS satellite links, secure against malicious launch providers; joint first author of *E-Laun: OTAR resistant to evil launchers* (ESA 3S 2025, IEEE).

TALK

GOHack26 — selected talk 30 Oct 2026

Fully homomorphic encryption: usage and limitations. Rust benchmarks with TFHE-rs on a smart-meter workload (18 ns plain vs 33 s encrypted per day).

EDUCATION

MSc Computer Science, cybersecurity 2023 – 2026
HES-SO Master (MSE)

BSc Computer Science, cybersecurity 2020 – 2023
HEIG-VD · 5/6 average · thesis: FHE for genome-wide association studies

Languages — French (native), English (professional)