Hugues Bruant

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I have 20 years of experience with software engineering, a deep drive towards robustness and efficiency, and a knack for noticing high-leverage opportunities that most people miss or shy away from.
I would like to use those skills on projects that bring tangible value, or joy, to their users.

Work Experience

Independent Software Consultant — **self-employed** — San Francisco, CA June 2023 – present
4 months sprint to help a client meet a migration deadline for an old system that needed to be retired quickly after a substantial outage endangered contractual requirements.

Staff Software Engineer — **Affirm** — San Francisco, CA December 2018 – May 2023
Led Python 2 to 3 migration, solving dozens of complex roadblocks to ensure a smooth cutover of the critical underwriting and fraud ML models, and all the associated training and inference infrastructure.
Improved tooling and processes to enable a jump in ML model release velocity from ~1/y to ~10/y.
Increased robustness, usability, and performance of the critical Risk Validation test flow, used to assess the impact of code and model changes on the outcome of underwriting and fraud decisioning before merge/deploy.
Decreased typical CI time-to-green build from >90min to <10min, despite order of magnitude increase in scale.
Decreased typical python env setup from >5min to a few seconds, and enabled sub-second updates.
Drove a sustained effort to add Python type annotations to core internal libraries and fix latent type errors across the entire codebase. Sped up typechecking by orders of magnitude through a combination of better internal tooling, and upstream fixes.

Principal Software Engineer — **AeroFS** — Palo Alto, CA June 2016 – August 2018
Redesigned the AeroFS desktop client auto-updater to perform incremental upgrades, and deduplicate shared data across client OS, shaving hundreds of MB off the appliance disk footprint, and enabling near-instant updates (down to a few seconds, from multiple minutes).
Designed and implemented the new AeroFS Storage Agent, alternative to the old Team Server, to address the requirement for a well-understood and scalable org-wide file server within a B2B private cloud context.
Orchestrated a complete re-architecting of the Amium product from private cloud to SaaS.
Led exploratory work to incorporate machine-learning models to improve UX in the Redbooth product.

Senior Software Architect — **AeroFS** — Toronto, ON, Canada November 2014 – May 2016
Led a major overhaul of the core distributed file synchronization algorithm.
Delivered significant scalability improvements across the entire product: shaving hundreds of megabytes from the private cloud VM disk and RAM footprint, and allowing it to scale to order of magnitude more users on equivalent hardware.
Led the upgrade from Java 6 to Java 8 across both desktop clients and backend services, with a custom build of the JRE, incorporating some critical patches.

Software Engineer — **AeroFS** — Palo Alto, CA July 2012 – October 2014
Delivered major scalability and UX improvements to the AeroFS desktop client, allowing it to gracefully scale to significantly larger datasets (tens of thousands of directories, and millions of files).
Designed and implemented the RESTful Content API and related proxy/tunnel protocol to safely expose users' files via a web interface without sacrificing E2E encryption guarantees.

Software Engineer Intern — **ARM** — Cambridge, UK June 2011 – October 2011
Improved performance of the ARM simulator (accurate emulator of various ARM hardware architectures on x86 machines) through judicious use of multithreading and wait-free queues.
Exploratory project integrating JIT-compilation into the ARM simulator to improve performance.

Software Engineer Intern — **Google** — Zurich, Switzerland June 2010 – August 2010
Rewrote the core sitemaps scheduler, a significant piece of the indexing pipeline, to achieve better parallelism and improved scalability.
Received a peer bonus for "awesome work on sitemaps".

Notable Open Source Projects and Contributions

prunepytest – *personal* – Python, Rust, pytest 2024
Extremely fast static computation of the Python import graph for large codebases, by leveraging the Python parser from Ruff, and PyO3 to integrate into a Python module. Quick derivation of a **minimal safe** subset of affected tests to run in order to exercise any given code diff, enabling order of magnitude savings in time-to-green build and overall CI cost when deployed at scale.
As a benchmark, for one medium-sized company it was tested on, with a codebase on the order of multiple MLoC of Python, parsing the entire codebase from scratch and computing the test set took a few seconds on a 2020-vintage macbook pro, and a conservative estimate of savings amounted to ~1M USD/year, for EC2 instances alone.

mypy – Python 2020 – 2022
Multiple significant performance improvements upstreamed into mypy.

golang – Go 2017
Multiple performance improvements upstreamed into Go runtime and compiler.

SSMP – *AeroFS* – RFC, Go, Java 2015
Design, specification, and reference implementation of a simple messaging protocol.

gockerize – *AeroFS* – Go, docker, bash 2015
CLI tool to easily package Go app into a single-binary docker image.

casim – *CMU* – C++, CUDA, VHDL 2012
Parallel simulation of Conway's Game Of Life, on GPU and FPGA.

almostrisc – *Ensimag* – VHDL, assembly 2010
16bit pipelined CPU design, in VHDL, with VGA and PS/2 peripherals, targeting Spartan 3 FPGA.

XOS – *personal* – z80 assembly 2009 – 2010
Operating System for TI-83+/84+ graphing calculators.

Edyuk – *personal* – C++, Qt4 2006 – 2009
IDE targeted at C++/Qt4 projects, with extremely fast and accurate code completion.

Education

Carnegie Mellon University — Pittsburgh, PA, USA Spring 2012
Exchange semester in the Computer Science department.

Ensimag, Grenoble Institute of Technology — Grenoble, France 2009 – 2013
MS in Computer Science and Applied Mathematics.

Languages

Computer: Python, Go, Java, C/C++, Rust, Assembly (z80, MIPS, x86, ARM), VHDL, Bash

Human: English *(fluent, TOEFL iBT 111/120)*, French *(native)*