Arnaud Bailly *26 avril 1969*

arnaud@pankzsoft.com • https://github.com/abailly-iohk • dr_cod3 (*twitter*) •
www.linkedin.com/in/arnaudbailly

Summary

I am an experienced technical lead, architect and software engineer with a proven track record of delivering business-focused high-quality solutions quickly and efficiently. I have a wide array of skills and knowledge in anything software-related with a particular focus on software engineering, language design and implementation, functional programming, applied formal methods, automated testing and DevOps.

I am currently most interested on finding novel and efficient ways to develop distributed and decentralized applications and systems, particularly looking into statically typed languages-based solutions whether functional like Haskell or Idris, or imperative like Rust or C. I want to explore how applied formal methods and techniques from programming language theory mix with agile and lean software development practices like, particularly eXtreme Programming. I also have an interest in maintaining and improving existing applications, whether using legacy or brand-new technologies.

Strong team player and seasoned team leader, I am always on the look for better ways to collaboratively develop and maintain software stack, hence my decades-old interest in *Agile development* theory and practice with a focus on actual coding techniques rather than organisational tools.

Work Experience

Input Output Global   Singapore (remote)
  Lead Architect – Innovation   *Feb 2024 – present*

Inside the Innovation department of the company, I am in charge of leading one of the R&D initiatives on faster settlement protocol for Cardano

- Lead teams of formal method specialists and senior engineers to quickly build executable specifications of complex Ouroboros protocols extensions (Peras, Leios)
- Develop formal-methods based engineering process, *Agda* specification, *Haskell* and *Rust* prototypes, *QuickCheck* model-based testing
- Modeling and simulating expected performance and resources need for the new protocol
- Working with Product to evaluate impact on the network and possible changes to incentives

  Head of Architecture for Scaling   *May 2023 – present*

I am part of the leadership of the *Scaling Tribe*, a newly formed division of IOG that's focusing on building tools to support the growth of the Cardano ecosystem:

- Continuing work to improve and grow *Hydra* and *Mithril* tools
- Defining the product and technology strategy for the tribe and the tools we are developing

- Initiate new R&D initiative on faster settlement protocol for Cardano

Head of Architecture for Cardano *Sep 2022 – April 2023*

I overseer the evolution of the architecture of the *Core Tech* components providing foundation to the Cardano eco-system: Cardano node and network, API, Mithril, Hydra ..., managing a team of three senior architects.

Technical Lead – Mithril *Sep 2021 – Sep 2022*

I am in charge of Mithril *Proof-of-Concept* to turn research into a viable system for trustless snapshotting of Cardano's state.

- Provide high-level architecture of the target solution
- Manage external contractors to deliver a working solution iteratively and incrementally
- Work with *Product* team on a *Feature Map* to clarify the scope of the PoC
- Support Mithril within Cardano community and partner organisations
- **Technology stack**: eXtreme Programming, Rust, *Cryptography*, *Blockchain*, Cardano, Docker, GCP

Technical Architect – Hydra *Mar 2021 – Sep 2022*

Within the Engineering division of *IOG*, the company behind the development of Cardano, a novel *proof-of-stake* blockchain backed by peer-reviewed research, I am part of the team developing Hydra, a *Layer 2* solution.

- Architecture, design, and implementation of core node needed to build layer 2 networks
- Design and implementation of *Smart contracts* needed for securing operations on Layer 1, using Cardano's antive *Plutus* language
- Setup and advocate for *Agile* software development practices: Test-Driven Development, Pair and Ensemble Programming, Continuous Delivery...
- Support and advocate for Hydra within Cardano community and partner organisations
- **Technology stack**: eXtreme Programming, Haskell, Plutus, *Smart Contracts*, *Blockchain*, Cardano, Docker, GCP

Solina Group   Rennes, France
Co-Tech Lead *Jan 2020 – Feb 2021*

I helped the team working on Solina's PIM/PLM platform to incrementally migrate their software from client/server application in PowerBuilder to a modern cloud-based microservice architecture.

- Coaching team members on *Agile* development practices
- Requirements analysis and refinement with product team and users
- Development of a test and continuous integration framework for *Powerbuilder*
- **Technology stack**: Powerbuilder, C#, Angular, Azure, eXtreme Programming

Symbiont.io   New-York, USA (remote)

Lead Software Engineer   *Jun 2018 – Dec 2019*

- Design and implement a fullstack loans management solution on top of Symbiont's Smart Contracts platform
- Hire and lead a distributed (USA, UK, France) team of engineers working in close collaboration with the product management team
- Deliver incrementally a working solution testable by the end-users, based on eXtreme Programming principles: Test-Driven Development, Pair and Mob Programming, Whole Team integration, Short feedback loops...
- **Technology stack**: eXtreme Programming, Custom Blockchain language, Typescript, React, GraphQL, Python, Haskell, Docker, Kubernetes

Senior Software Engineer   *Jul 2017 – May 2018*

- Implement a key component of the platform responsible for the execution of a distributed ledger's atomic transactions.
- Coach the team getting up to speed on Haskell development eco-system and best practices, esp. regarding application architecture, property-based testing, components structuring...
- Design and develop a distributed model-based testing solution for the platform, inspired by Jepsen. This became the standard integration and system-level testing solution for the company. It defines a high-level *Domain-Specific Language* to describe the various actions available to clients and topology of the system.
- **Technology stack**: Haskell, Blockchain, Docker, Kubernetes, GCP, Microservices

GorillaSpace   Singapore (remote)

CTO and Co-Founder   *Dec 2016 – Mar 2017*

- Designed and implemented a prototype solution for office space marketplace enabling actors in the commercial property market to increase the yield of their spaces
- **Technology stack**: Haskell, Elm, Docker, GCP, AWS, Micro-services

Capital Match   Singapore (remote)

CTO and Co-Founder   *Aug 2014 – Mar 2016*

- Designed and grew the leading peer-to-peer lending platform in Singapore, managing S\$7.5M+ loans and 2K+ investors: Features included complete loan payment processing, emails alerting, bank reconciliation, profile and user's management, accounting...
- Designed and built infrastructure management software for secure and safe operations of the platform: continuous integration through self-hosted git push, automated build and deployment of docker-based services, version-controlled configuration management...
- Hired and managed a distributed team of 3 software engineers- Setup and facilitated lightweight kanban-style development process
- Use Haskell for most software in the stack, including custom event-sourced data storage, REST API, build and production infrastructure software- aggressive automation for provisioning and managing hosts, Riemann monitoring, digital ocean and AWS hosting
- **Technology stack**: Clojurescript, React, Haskell, Docker, Microservices

Murex   Paris, France

Freelance Consultant · *Jun 2016 – Jul 2016*

As part of the R&D Team, I studied potential integration of several open-source distributed data streams processing tools within existing system.

- Survey of existing OSS platforms, most notably Spark eco-system
- Analysis of existing code and system's features and coding of exemplar use cases in Spark
- Suggestions for future improvements and integration roadmap.
- **Technology stack**: Java, Scala, Spark

Solution Architect and Developer · *Jun 2013 – Aug 2014*

- I designed and developed a distributed solution based on REST principles and web technology to operate the MX.3 platform, providing a central configuration endpoint for orchestrating a multi-site MX.3 environment
- Exposes a REST API to start/stop services across a cluster and provide live feedback on startup/shutdown process and status
- Worked with Singapore team to implement the solution for real customers and helped making it live in production
- **Tech stack**: Java, REST API, Docker, Jenkins

Senior Developer & Consultant · *Sep 2012 – May 2013*

As member of cross-functional team, I help functional teams and project improve their software development process, coding and designing in Java. I also work on proposing global best practices and standardizing key components and practices to improve velocity and quality of developments.

Senior Developer & Architect · *May 2010 – Sep 2011*

- Lead developer for performance improvement, code cleaning and scalability
- Member of a team of 10+ people, working on a middleware platform for Murex
- Core developer for the platform, involved in evolving the architecture and design to ensure and maintain production-quality software, including build engineering, release engineering, backlog and roadmap maintenance

Agile Enabler · *Jun 2009 – Apr 2010*

- Within a team of 4 people, help Murex' software developers community reduce lead-time and defects by applying "modern" software development techniques and tools: eXtreme Programming, Lean, TDD, and provide services and tools to help them improve their development effort(reduce lead-time, reduce defects)
- Introduced and help spread Test Driven-Development, Pair Programming, BDD and various XP/Agile techniques
- Work on improving build system (cross-platform mixed C/C++/Java)
- **Technology stack**: Java, C/C++, Jenkins, Oracle

PolySpot · Paris, France

Lead Developer & Architect · *Sep 2011 – Aug 2012*

- I lead a small team of developers working on a component part of the next major release of PolySpot's product, PolySpot Enterprise Search.
- This component is responsible for storing metadata of documents and managing transformation, indexation and querying over this large dataset
- **Technical stack**: Java, MongoDB, Akka, NLP

OQube · Lille, France

Consultant *Jun 2006 – Jan 2010*

I provided consulting services, short term, long term, part-time or full-time to help improve software engineering practices with a strong Agile / XP slant, mostly in an open source Java/J2EE environment, including:

- XP coaching / mentoring and technical leadership- code and design practices and training
- XP tools and techniques setup and training: Test-driven development, continuous integration, pair programming, incremental design, automate acceptance testing
- prototyping and exploratory development

Courtanet — Paris, France

Coach & Architect *Apr 2008 – Mar 2009*

- Part of R&D team developing an insurance policy comparison platform
- Coached a team of 6 engineers on Agile software development practices: Test and Behaviour driven development, continuous integration and continuous delivery, iterative planning...
- **Technology stack**: Javascript, Java, XUL

Norsys — Lille, France

Research Engineer *Sep 2001 – Mar 2006*

During my PhD thesis, I took part in various prototype and proof-of-concepts projects for several customers:

- Implementation of a mobile (WAP) commercial website of a retail company
- Code analysis and generation for reimplementation in Java of a legacy application
- Design and implementation of asynchronous message-passing platform for batch processing
- Training and coaching of developers teams in testing, continuous integration
- Implementation of software quality analysis tools

Sans Peur et Sans Reproche — Lille, France

Co-Founder *Apr 1994 – Dec 1997*

- Founded Role Playing Game and Boardgame publishing company with 3 friends
- Managed print publishing process, relationship with printers, technical infrastructure and software for professional publishing- Took part in writing, editing, typesetting all our products
- Coded a Point-of-Sale management software for our RPG shop

Crédit Agricole — Lille, France

Account Manager *Feb 1991 – Mar 1994*

Within the Small Businesses Department of a regional retail bank, I managed a portfolio of about 60 customers, dealing with all the aspects of business banking: Loan underwriting, treasury, delinquent loans recovery...

Education

Université des Sciences et Technologies de Lille — Lille, France

PHD, Computer Science *Sep 2001 – Sep 2005*

Thesis subject: *Test and Validation of Component Software*

MsC, Computer Science *Sep 1998 – Jun 2001*

SKEMA Business School — Lille, France

Master, Business administration *Sep 1987 – Sep 1990*

Skills

Technical expertise: Over the years, I have accumulated experience and knowledge on a wide array of fields related to software architecting, engineering and development, with a bias towards hands-on coding excellence.

- *Software design and implementation:* Strong emphasis on *testing*, e.g. Test-Driven Development, System-level testing, Property and Model-Based Testing, Test cases generation, Behaviour Driven Development to foster business-developers collaboration (FitNesse, Cucumber) ; *Distributed Systems* design and implementation
- *Agile software development practices*: eXtreme Programming, Scrum, Continuous integration processes and tools, Domain-Driven Design
- *Functional Programming*: Haskell, Idris, Elm, Clojure, Scala, OCaml
- *Object-Oriented Programming*: Java, a bit of C++ and .Net, Design Patterns, UML
- *Web technologies*: Solid knowledge of HTTP, HTML, CSS, REST APIs, Javascript-based programming (React/Redux, Clojurescript, Typescript)
- *Cloud*: Docker, GCP, DigitalOcean, Azure, AWS, DevOps

Natural languages: French (*mother tongue*), English (*full professional proficiency*), Spanish (*rusty*)

Interests

Non-exhaustive list, in random order: philosophy (esp. philosophy of the mind and phenomenology), sociology, literature (french, russian classics), art (modern and contemporary), sport (mostly to stay fit), coding and programming, (un)conferences on software, cooking...