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Toby Hutton

Professional Experience

Rocket Software

Rocket are helping Services Australia to modernise their mainframe based social services platform.

Principal Software Engineer **Jan 2026—present**

Contributed to a project to systematically translate a 30+ year old mainframe codebase written in an esoteric database query language and Cobol to Typescript and a modern database environment. The focus was to automatically generate readable and maintainable modern code which could then be used by the Services Australia developers for future calculations.

Miden

Contributed to the Miden compiler toolset which takes Rust source to MidenVM bytecode via WebAssembly.

Staff Compiler Engineer **May 2025—Jan 2026**

Miden implement a blockchain employing ZK proofs for accelerated throughput with a Rust based toolchain.

Role involved working on the bespoke compiler pipeline which takes WASM produced by Rust and transforms it into a native IR and then to Miden VM bytecode. This involved writing transforms from the WASM component model API to IR, writing IR optimisation passes, and generating low-level stack oriented VM assembly for runtime.

Essential Contributions

Worked on a constraint-based language compiler, targeting a bespoke blockchain platform.

Senior Compiler Developer **May 2023—May 2025**

Essential was an early stage start-up in the crypto/blockchain space.

Role involved designing and implementing from scratch a constraint based programming language using Rust. This included designing both the syntax and semantics of the new language as well as writing a parser, type-checker, optimisers and code generator for the language.

As a part of a very small team the role was also to mentor other team members working on the compiler as well as to triage issues and perform code reviews.

Fuel Labs

Worked on a smart contracts language compiler, targeting a bespoke blockchain.

Compiler Developer/Team Lead **Aug 2021—Apr 2023**

Fuel developed technologies for optimising the block-chain including a VM and high level language called Sway, for writing smart contracts. Sway resembles Rust and is implemented entirely in Rust.

Role was as a lead for the compiler team, to plan and prioritise features, to triage bugs, as well as to review contributions and mentor the more junior devs. More practical work involved helping implement various parts of the Sway compiler, from the front-end (parsing, type-checking) and middle-end (optimisations) to the back-end (VM bytecode generation).

Designed and implemented the middle-end intermediate representation (IR) stage to the compiler pipeline, inspired by LLVM, and focused on improving the bytecode generation.

Symmetry Investments

Worked on implementing runtime library functionality for a domain specific programming language written in D.

Senior Development Consultant **Sep 2020—Aug 2021**

Symmetry Investments is a hedge fund employing a team of developers to work on their internal trading tools. One of those tools is a special programming language used to perform all sorts of tasks, from data conversion and risk analysis to managing market data or even personnel information. The role involved improving the language runtime to enable traders to use it productively and efficiently.

Iress

Worked with a team developing protocol interfaces and translators between a financial trading platform back-end and the various global securities exchanges.

Senior Engineer **May 2020—Sep 2020**

Telstra

Part of a remote team which developed firmware modules for Telstra home internet gateways. Highly concurrent embedded C++ targeting MIPS and ARM devices running OpenWRT Linux.

Senior Technology Specialist **Aug 2018—May 2020**

Developed a speed testing client which gathered data from Telstra customer residences and reported network health back to several departments within Telstra, including for future capacity planning and ACCC reporting. TCP and UDP traffic was generated and measured, and then coordinated and reported over an MQTT network to a distributed back-end.

Also helped the team manage and maintain the back-end systems written in C++, Python and Go.

Veltronix

Joined a small team developing high level synthesis tools targeting FPGAs. Veltronix's main product was a C/C++ compiler based on the LLVM framework which targeted Verilog suitable for several different FPGA platforms, including those from Intel, Xilinx and MicroSemi.

Senior Software Developer **Nov 2015—Aug 2018**

Veltronix Accelerate—a C/C++ compiler with a novel architecture, targeting custom hardware as opposed to the usual CPU back-end. Duties included writing middle-end passes for specific optimisations, writing back-end passes for the hardware generator and writing supporting frameworks for the complex models involved in custom hardware execution. A strong familiarity with the LLVM framework and compilers in general was required, along with solid understanding of hardware design.

Also developed a lidar Simulator—a lidar component (similar to radar but using lasers) suitable for use within the Unreal Engine game development framework.

Blackmagic Design

Worked with remote teams on digital media post-production software suites.

Senior Software Engineer **Jun 2015—Nov 2015**

Designed a media API to abstract away the interfaces to the numerous file format libraries use by Blackmagic Design's DaVinci and Fusion desktop software suites.

Microsoft

Joined the Seattle based anti-malware engine development group as a part of a small remote team in Melbourne.

Senior Software Design Engineer **Oct 2011—Jun 2015**

Developed a JavaScript Interpreter—an ECMAScript parser and interpreter for use in running potentially malicious scripts in a controlled emulated environment.

Software Design Engineer 2 **May 2008—Oct 2011**

Worked on different anti-malware projects involving reverse engineering malicous compressed Win32 executables and contributing to the Win32 emulator environment.

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