Luqman Aden

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Experience

Industry

May 2021 – Present **Software Engineer**, *Oxide Computer Company*, Redmond, Washington.
Building hyper-scaler infrastructure for the rest of us.

Jul 2017 – May 2021 **Software Engineer II**, *Microsoft*, Redmond, Washington.
Working on improving the reliability, security and performance of the Windows VPN client stack:

- Owned various components in the stack:
  - Low-level kernel drivers for setting up virtual tunnel and data paths
  - System services for managing VPN connections
  - APIs for interacting with platform and injecting custom protocol stack
  - APIs for provisioning client profiles
  - Integrated UI for displaying connectivity state
- Improved reliability with CI systems by introducing per-PR tests
- Quickly became expert on VPN data path subsystems and mentored new team members and interns
- Developed general skills in debugging large and complex systems quickly and communicating gaps
- Brought throughput improvement of almost 3x (280Mbps to 820Mbps) in testing environment
- Wrote initial implementation of Azure VPN UWP App using OpenVPN protocol
- Member of Rust Windows Working Group: help diagnose Windows-specific Rust issues
- Designed and implemented new WinRT APIs

Open Source

Rust Contributor to the Rust programming language and compiler:

- Added initial inline assembly support
- Removed explicit move syntax
- Removed the last bits of structural records
- Implemented suggestions for unresolved names
- Changed compiler to emit a loop for array repeat expression instead of 2n instructions
- Added support for calling variadic C functions
- Added attribute to specify exported symbol name
- Fixed use-after-move exposed via trait coercions
- Taught LLVM to preserve nonnull metadata on loads that get optimized out
- Removed reflection
- Allowed specifying linkage type on any static
- Expanded the scope of the nullable pointer optimization to work transitively. This changed reduced the size of many common type patterns
- Removed incorrect micro-optimization of Boxed types
- Fixed rustc to better model SysV ABI
- Implemented initial support for function calls in MIR driven codegen
- Taught LLD to correctly annotate alignment for TLS values
- Fixed CodeView register mappings for 32-bit ARM Windows targets
- See more

Education

2011–2017 **Bachelor of Mathematics**, *University of Waterloo*, Waterloo, Canada.
Majors: Computer Science, Combinatorics and Optimization

Research

Sept–Dec 2016 **Student Researcher**, *University of Waterloo*, Waterloo, Canada.
Worked with Professor Werner Dietl on pluggable type systems with Checker Framework.
Implemented more detailed explanations for programs where annotations could not be inferred.

May–Aug 2016 **Part-time Student Researcher**, *University of Waterloo*, Waterloo, Canada.
Worked with Professor Ondřej Lhoták on performance work for the logic programming language Flix.
Implemented simple PoC optimization passes: Copy Propagation, Constant Folding, Dead Code Elimination.

Industry Internships

Sept–Dec 2015 **Software Engineer Intern**, *Microsoft*, Bellevue, Washington.
Worked on Microsoft Dynamics CRM and improved warm-load times for the mobile client by about 300ms on desktop and almost 2s on Android/iOS.

Jan–Apr 2015 **Compiler Engineering Intern**, *Apple*, Cupertino, California.
Worked on the Swift Performance team implementing optimizations and improving developer tools.

May–Aug 2014 **Research Intern**, *Mozilla*, Mountain View, California.
Worked on improving performance and correctness of the **Rust** compiler and LLVM backend:

- Adjusted compiler intrinsics to be emitted at call site instead of creating wrapper functions. Resulted in 10% improvement in time spent in LLVM
- Changed enum and newtype struct constructors to emitted in-place instead of creating wrapper functions
- Merged code paths for local and cross crate defined FFI fns to fix make sure we handle them uniformly
- Annotated non-null pointers to help LLVM optimize out null checks and supplemented with dereferencable attribute
- Fixed LLVM handling truncating stores of double to float with SSE disabled
- Fixed passing packed structs to FFI fns
- Enabled coercing through arrays
- Changed the match codegen to reuse the same stack slot for by value bindings
- Extended null pointer optimization to slices, closures and trait objects

Sept–Dec 2013 **Software Developer Intern**, *Yelp*, San Francisco, California.
Worked on migrating the internal account search to ElasticSearch for better performance and more flexibility.

Feb–Apr 2013 **Mobile QA Intern**, *Mozilla*, Mountain View, California.
Developed manual and automated testcases against Firefox OS. Addressed and fixed various issues with the build and testing infrastructure.

May–Aug 2012 **Software Developer Intern**, *BlackBerry*, Waterloo, Canada.
Worked in developing C++ API components, code samples and build infrastructure for the BlackBerry 10 SDK. Also worked on integration with the Qt framework.

Projects

b2-galaga — A quick Rust port of a simple Galaga-esque game to experiment with Rust game engines and entity component systems.

mcchat — A command line chat client for Minecraft written in Rust. A fun little demo for the IO capabilities of Rust (out-of-date).

RemoteJoy+ — A framework to export your PSP's screen to multiple clients including a local SDL client as well as a websocket server to stream to webpages.

xMangaPSP — A native C++ PSP comic reader with an accompanying API endpoint written in Python hosted on Google App Engine. Features an extendible XML-based UI.

Misc. — You can find some more of my projects and contributions at Github.