

Petr Penzin

Software engineer working on compiler technologies with focus on correctness and performance.

Professional Experience

Mar 2020– **Fortran Compiler Engineer**, *Intel*, Hillsboro, OR.

Current Working on LLVM infrastructure for Fortran.

- Alias Analysis
 - Fit LLVM alias analysis functionality to use with Fortran
 - Participate in discussions with LLVM community on improving Fortran support
- Various bug fixes and performance improvements

July 2018– **Web Runtime Compiler Engineer**, *Intel*, Hillsboro, OR.

Mar 2020 Worked on optimizing Web runtimes on Windows, contributing to future Web standards.

- World Wide Web Consortium group for WebAssembly
 - Review proposed features from x86(64) point of view
 - Core work on fixed-width SIMD proposal - feature discussion, prototyping, and testing
 - Maintainer of flexible SIMD proposal
- Compiler toolchain for Chromium project - LLVM linker
 - Implemented support for Intel's Control Flow Enforcement Technology on Windows, upstreamed to LLVM
- ChakraCore - JavaScript engine powering (legacy) Edge browser
 - WebAssembly support
 - JavaScript dynamic decompilation optimizations

Nov 2017– **Consulting Compiler Engineer**.

- July 2018
- Software-defined networking compiler for a stealth startup.
 - Front-end and back-end work on a compiler for a networking ASIC
 - P4 language committee member – modularity proposal

Jul 2014– **Compiler Engineer**, *NVIDIA*, Beaverton, OR.

Nov 2017 High Performance Computing compiler engineer. Worked on compilers and runtimes for scientific and engineering cluster applications.

- Compiler maintenance
 - Fixed support for nested parallelism in OpenMP runtime
 - Modified LLVM-based backend to implement explicit register variable support
- Open source LLVM Fortran compiler (DOE contract), derived from Portland Group Fortran compiler
 - Implemented a new path in Clang toolchain to compile Fortran source files and handle Fortran-specific command line options
 - Forked proprietary compiler components and integrated them in Clang toolchain
 - Fixed bugs exposed by migration to a new LLVM backend
- Participated in porting C, C++, and Fortran compilers to OpenPower Linux (for upcoming CORAL system, under DOE contract)
 - Analyzed benchmark results, investigated and fixed correctness errors
 - Maintained compiler's LLVM backend: integrated new versions, provided debugging information support, etc

- Apr 2013– **SW Engineer / Tech Lead**, *UTi Worldwide*, Portland, OR.
Jul 2014 Software developer in the Platform team. Worked on performance analysis and system tools, provided recommendations to other teams.
- Oct 2011– **JR SW Engineer**, *The Portland Group, Inc (STMicroelectronics)*, Lake Oswego, OR.
Mar 2013 Intern in the Tools group. Worked on debugger and disassembler.
 - Optimized Multi-Process Debugging Support
 - Developed ARM Disassembler

Open Source Experience

Contributor, *LLVM linker*, LLVM Compiler Infrastructure, llvm.org.
Intel CET support on Windows.

Maintainer, *Fort*, Fortran Front End for LLVM compiler, fort-compiler.org.
Maintenance and various improvements: current LLVM support, Fortran Modules, bug fixes.

Contributor, *NekoVM/Haxe Foundation*, nekovm.org.
Maintain Neko language and virtual machine port to FreeBSD, contributed other minor improvements. Wrote Haskell package to assemble and disassemble Neko bytecode.

Technical expertise

- Languages C, C++, Java, Fortran, Haskell, Pascal, R, P4
Scripting Python, Perl, Tcl, PHP, Bash, CShell, Windows Shell
OS Linux, Windows, FreeBSD, Mac OS X
Architectures IA-32, Intel 64, IA-64, ARM, OpenPower
Profilers PGProf, perf, Oprofile, Java VisualVM, JRockit
Debuggers GDB, PGDBG, JDB, WinDBG
Configuration Puppet, Vagrant
Verification Jenkins, Valgrind, Cmockery, Google Test

Education

- 2010–2013 **MS in Computer Science**, *Portland State University*, Portland, Oregon.
Some of the courses taken: Compiler Design, Computer Architecture, Modern Language Processors, Theory Of Computation, Advanced Computer Architecture I and II, Programming Languages
Select projects: Lightweight Just-in-time compiler for Java byte code, Survey of parallel sorting algorithms using MPI.
- 2003–2008 **BS in Physics and Computer Science**, *Vologda State Pedagogical University*, Vologda, Russia.
Thesis topic: Numeric Simulation of Hydro-Acoustic Luminescence.
The thesis focused on finding numerical solutions for ordinary differential equation for different acoustic frequencies and different media properties.