

The Software Architecture of the P4₁₆ Reference Compiler

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Abstract

This presentation will describe the P4₁₆ reference compiler architecture, available under an Apache 2.0 license at <https://github.com/p4lang/p4c>. This compiler implements the new specification of the P4 language, P4₁₆, but it can also translate programs written in P4₁₄ to the new P4₁₆ syntax. The compiler is designed to be modular and extensible. The front-end is target-independent, and it performs validation, type checking, and canonicalizes the representation. The mid-end is a library composed of many compiler passes, which can be assembled as desired by compiler writers for each compiler target. The back-end should be custom written for each specific target; the reference implementation comes with three sample back-ends: one generating P4 sources, used mostly for testing, one generating JSON consumed by the P4 behavioral simulator BMv2, and one generating C code intended for compilation to eBPF.

Bios

Mihai Budiu is a senior researcher in the VMware Research Group. He has received a Ph.D. from Carnegie Mellon University in 2004. Previously he has worked at Microsoft Research and Barefoot Networks. Mihai's research has spanned multiple domains during the years: reconfigurable hardware, computer architecture, compilers, computer security, distributed systems, big data platforms, large-scale machine learning, and programmable networks.

Chris Dodd is a Compiler Engineer at Barefoot Networks with 25 years of experience with compilers and DSLs for many different hardware platforms.

Details

This presentation is based in large part on the documentation available in the compiler source tree under the doc/ folder; the size of the presentation will be tailored to the available time.