Getting Started with LLVM Core Libraries

Bruno Cardoso Lopes, Rafael Auler

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Getting Started with LLVM Core Libraries Bruno Cardoso Lopes, Rafael Auler
Get to grips with LLVM essentials and use the core libraries to build advanced tools

About This Book

- Learn how to configure, build, and use LLVM and Clang based tools
- Explore the depths of the LLVM front-end, IR, code generator, and libraries, and learn how a modern compiler is implemented in a practical way.
- Customize your project to benefit from Just in Time compilation (JIT), static analysis and source-to-source transformations.

Who This Book Is For

This book is intended for enthusiasts, computer science students, and compiler engineers interested in learning about the LLVM framework. You need a background in C++ and, although not mandatory, should know at least some compiler theory. Whether you are a newcomer or a compiler expert, this book provides a practical introduction to LLVM and avoids complex scenarios. If you are interested enough and excited about this technology, then this book is definitely for you.

What You Will Learn

- Configure, build, and install extra LLVM open source projects including Clang tools, static analyzer, Compiler-RT, LLDB, DragonEgg, libc++, and LLVM test-suite
- Understand the LLVM library design and interaction between libraries and standalone tools
- Increase your knowledge of source code processing stages by learning how the Clang frontend uses a lexer, parser, and syntax analysis
- Manipulate, generate, and play with LLVM IR files while writing custom IR analyses and transformation passes
- Write tools to use LLVM Just-in-Time (JIT) compilation capabilities
- Find bugs and improve your code by using the static analyzer
- Design source code analysis and transformation tools using LibClang, LibTooling, and the Clang plugin interface

In Detail

LLVM is a bleeding edge compiler technology framework. Easily extendable and designed as a multitude of libraries, LLVM provides a smooth experience for compiler newcomers and reduces the steep learning curve often associated with compiler development.

To start, this book will show you how to configure, build, and install LLVM libraries, tools, and external projects. Next, you will be introduced to LLVM design and how it works in practice throughout each LLVM

compiler stage: frontend, IR, backend, the JIT engine, cross-compilation capabilities, and the plugin interface. With multiple hands-on examples and source code snippets, Getting Started with LLVM Core Libraries ensures a solid and smooth first step into the LLVM compiler development environment.

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