

# Clang/LLVM in FreeBSD

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November 20, 2010



# The current state in FreeBSD

- ▶ GCC 4.2.1/Binutils 2.1.{57} and no updates allowed
- ▶ Old, buggy, unmaintainable
- ▶ Missing features - C++0x, newer CPUs support
- ▶ Evil license ;)



# What is Clang/LLVM

- ▶ C/C++/ObjC compiler
- ▶ Production quality
- ▶ Developer friendly (inside and outside)
- ▶ BSD-like license



# What is Clang/LLVM

- ▶ Supports - X86, ARM, PowerPC, Mips, Sparc and others
- ▶ Advanced optimizations (LTO, JIT etc.)
- ▶ Drop-in replacement for GCC
- ▶ Integrated assembler
- ▶ Actively developed (Apple, Google, Cray, OSS ...)



# User experience of clang

- ▶ Fast, assert - 10% faster, release - additional 20-30% faster
- ▶ Friendly warnings and errors
- ▶ Correct (boost, booting FreeBSD world/kernel)
- ▶ Advanced (library approach, integrated-as)
- ▶ Community



# Status of Clang/LLVM

- ▶ Compiles Linux kernel
- ▶ Compiles chrome/boost/ffmpeg/etc.
- ▶ LLVM used as a backend everywhere (python, gallium etc.)
- ▶ Various tools based off clang
- ▶ .... the world (of compilers) is changing



# LLVM side-projects

- ▶ compiler-rt
- ▶ libc++
- ▶ lldb



# Status of Clang in FreeBSD

- ▶ Clang/LLVM 2.8 committed to world
- ▶ Compiles almost everything (world and kernel) on amd64 and i386
- ▶ PowerPC almost there except vaarg
- ▶ Mips is half usable (vendor help)
- ▶ ARM is unknown but promising (we need your help here!)





# Clang problems

- ▶ GCC is the only compiler, right?
- ▶ C89 vs C99
- ▶ Clang is more strict than gcc 4.2.1
- ▶ Code size problems (boot2)
- ▶ .... but all of these are being worked on as we speak



# Clang future in FreeBSD

- ▶ Next import - integrated-as, TBAA, fixes
- ▶ Importing binutils 2.17 (which fixes powerpc with clang)
- ▶ Ports exp run
- ▶ Fixing boot2
- ▶ Switching to clang/LLVM by default?



# Clang/LLVM future

- ▶ Native linker (with LTO)
- ▶ Polly (<http://wiki.lvm.org/Polly>)
- ▶ Embedding LLVM and/or clang
- ▶ More optimizations and bug fixes
- ▶ Take over the world!



# Questions?

