Integrating LLVM into FreeBSD

2011 LLVM Developers Meeting   Brooks Davis

GNU Toolchain

- GCC
- BinBSiDElfTools
- GDB

2006

2007

Toolchain Freeze

2007

Clang

2007

2008 & 2009

The Times

2 Feb 2010

Clang Self-Hosting

Cupertino -- Today, Clang completed its first complete self-host! We built all of LLVM and Clang with Clang (over 550k lines of C++ code). The resulting binaries passed all of Clang and LLVM's regression test suites, and the Clang-built Clang could then build all of LLVM and Clang again. The third-stage Clang was also fully-functional, completing the bootstrap.

Congratulations to all of the Clang developers on this amazing achievement!

FreeBSD

Clang

2010

FOSDEM BSD Licensed Toolchain Summit

libc++ ported

LLDB port in started

2011

FreeBSD 9.0 Coming Soon

- GCC remains default

- Clang ~3.0 in base

- Much of libgcc replaced

- Some BSD ELF Tools

WIPs

- libc++ import

- LLDB port

- switchable ports compiler

TODO

- Finish libgcc replacement

- External toolchain support

- Switch for base compiler

- Clean cross build support

Acceptance Issues

If it ain't broke, don't fix it.

Quality concerns

Community Concerns

GCC investment

Questions of benefits

Weak or missing architectures

Clang/LLVM specific features?

When?

What kind?

Temporally Enhanced Security Logic Assertions (TESLA)

- Represent assertions as temporal logic or automata

- Assertions are tested on experienced paths at run-time

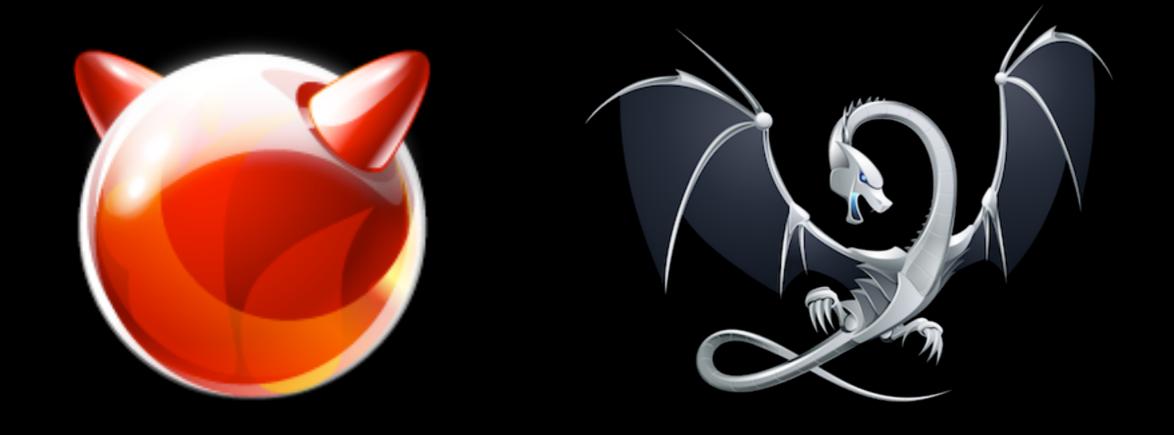- On failure: panic(), stack trace, DTrace events

Berkeley Packet Filter JIT

- Existing i386 and amd64 JIT from WinPcap

  - Pros: Lightweight, simple

  - Cons: Hardcoded, unoptimized

- LLVM would fix those issues

Firewalls

- Rulesets are DSLs
- Often use bytecode
- Too many

FreeBSD and LLVM
a powerful combination!