LLVM AArch64 buildbot

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Foundation Model

- AArch64 emulator from ARM.
- There was no accessible AArch64 hardware when we started to set up the buildbot.
- It needs a boot image and a rootfs to run.
  - There were a couple of solutions to choose from.
  - Currently the AArch64 buildbot uses the Linaro OpenEmbedded rootfs with the associated boot image.
Buildbot overview

- **Buildsteps**
  - Update the source from the SVN repository.
  - Clean the LLVM build directory.
  - Configure LLVM.
  - Compile LLVM.
  - Testing.
Issues with the Foundation Model

- Lack of software for AArch64 target.
  - Missing python modules.
  - Buildslave package not available.
  - SVN not available.
- Limited resources
  - Compiling LLVM on the Foundation Model takes too much time.
Solution

- Create a host-target system.
  - Use a powerful server machine as host.
  - The host runs the buildslave.
  - The host updates the source using SVN.
  - The host configures and builds LLVM using a cross-compile toolchain.
Solution

- Create a host-target system.
  - The host **shares** the source code and the compiled binaries with the Foundation Model using **NFS**.
  - The 'make check-lit' call is intercepted by a wrapper script which redirects it to the Foundation Model using **SSH**.
  - This whole process is completely transparent from the viewpoint of the **buildmaster** at llvm.org.
Paint it green

- When the AArch64 buildbot went online it was red for a while.
  - If a buildbot is constantly red no one will watch it when a patch is landed.
- The next goal was to make it green.
Bug hunting

- MappedMemoryTest failures
  - There was 16 MappedMemoryTest related failures.
  - They turned out to be caused by a Linux kernel bug in the memory manager of the \texttt{arm64} target.
  - Details: \url{http://goo.gl/TAeQxA}
  - The AArch64 buildbot uses the same patch since then.
Statistics

- Online since 2013-06-01
- More than 1500 builds.
- Compile time is about 14 minutes.
- Testing time is about 5 hours.
- The last 200 builds (on 2014-04-01):
  - 176 success,
  - 13 failures,
  - 11 exceptions.
Statistics

- Test coverage
  - 10169 expected passes,
  - 97 unsupported tests,
  - 83 expected failures.
Future work

- **QEMU**
  - The release tests has been tried to run using QEMU on December 2013.
  - There were many errors due to unimplemented instructions in QEMU.
  - It is much faster than the Foundation Model.
  - There has been much improvements in QEMU recently. We should give it a try again.
Thank you!

Visit us at the poster session!