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# 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 **arm64** target.
  - Details: 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.

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# Thank you!

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