State of the U-Boot

Thomas Rini, Konsulko Group

History, in brief

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- Separate projects of PPCBoot and ARMBoot, prior to November 2002.
- Merged, renamed to U-Boot, added x86
- Since then added more than 10 other architectures
- Wolfgang Denk as head custodian for over 10 years
- Tom Rini as head custodian since September 2012
- Lots more on Wikipedia

Community

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- Over 20 companies and 110 individual developers every release in the last year
- A number of talks at various industry conferences
- Contributing back up to the Linux Kernel when we share code

Architecture and SoC support

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- 32bit ARM
  - Atmel, Rockchip, Texas Instruments, NXP i.MX, Allwinner, Xilinx, UniPhier, Tegra, Marvell, STM32
- 64bit ARM
  - NXP Layerscape, Allwinner, Xilinx, UniPhier, Tegra, Marvell
- MIPS (Boston, Malta, etc)
- x86 (32 and 64bit, Baytrail, Broadwell, Quark, etc)
- … and this is of course an incomplete list

Important Features

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- SPL, Falcon Mode
- Cryptographic image support
  - Proprietary (TI, NXP) and not (FIT images)
- Generic distribution boot support
  - Fedora, Debian, others now, FreeBSD in progress
- EFI application support

Testing / CI

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- travis-ci.org
- test.py
- tbot
- Coverity
- board farms

Testing / CI (Travis CI)

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- Provides run-time-limited automated build and test instances.
- Able to build 97% of possible boards
- 10 QEMU-based test.py runs and sandbox
- Anyone can connect with their github and test prior to submission

Testing / CI (test.py)

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- Based on pytest framework
- Works on real hardware, QEMU and sandbox
  - Target local and Target/Host tests
- We also have test/fs/fs-test.sh
  - FAT and ext2/3/4 tests

Testing / CI (tbot)

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- "tbot is a tool for executing testcases on boards"
- Falls somewhere in between Jenkins and test.py
- Heiko Schocher has a good video demonstration on youtube titled "tbot git bisect demo"
  - https://www.youtube.com/watch?v=zfjpj3DLsx4

Testing / CI (coverity)

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- Community instance under “Das U-boot”
  - Limited to building for a single configuration, so sandbox
  - 45 defects in the last year
- Various vendors with commercial instances

Testing / CI (board farms)

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- DENX
- Various private companies

My board farm

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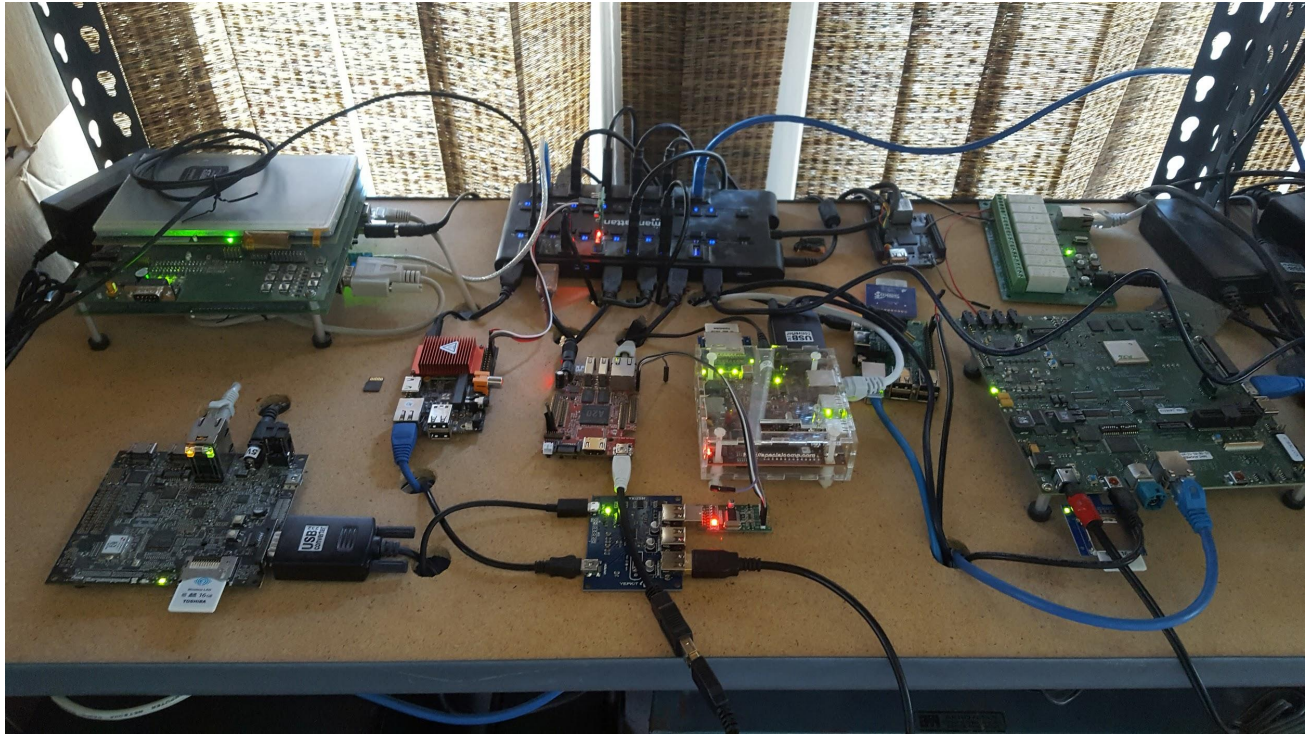

FlashAir, YKUSH and Relays

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- FlashAir WiFi enabled SD cards
  - See more at http://konsulko.com/?p=1419
- YKUSH
  - See more at https://www.yepkit.com/products/ykush
- Relay
  - See more at http://www.robot-electronics.co.uk/htm/ethoo8tech.htm

buildman, not MAKEALL

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- The venerable MAKEALL script was retired in July 2016
- The replacement, buildman, was introduced in April 2013
- More flexible
  - Multiple architectures in a single command
  - Describe what to build in regex form
  - Size comparison

binman

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- New tool for creating a functional output from one or more binaries
- Uses device tree syntax to describe the output.
- For example:
  - x86 describes where to place U-Boot and various required other firmware entries
  - Allwinner describes where to place SPL and then U-Boot in a single binary file
  - aarch64 can use this to describe where to place ATF, U-Boot, etc.

Kbuild / Kconfig

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- Kbuild, the make system from the Linux kernel, has been fully implemented for about 3 years.
- Kconfig transition, in progress since then.
  - Implementation is in-sync with v4.10
  - Emphasis on having logic in Kconfig files to ensure reasonable and minimal defconfig files
  - Start making use of the new imply keyword

In progress

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- Driver Model and Device Tree
  - Including SPL
  - Including figuring out how to deal with the extremely resource constrained systems (smartweb, Ci20)
- Device Tree
  - Live tree
  - Being able to pass our tree to Linux

Near term goals

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- Finish Kconfig migration this calendar year
- SPL + Linux and kexec? Happy to help!
- More test.py tests
- Strike up the conversation with kernelci.org again
- Find more time for stackoverflow questions
- Expand Coverity coverage