Linux for development boards

Presented by: Igor Pečovnik
Quick facts

- Community project
- Open source
- GPL 2.0
about me

- Founder, full time maintainer and developer @Armbian
- Small business entrepreneur ever since
- Fields of competence: math, electronics, computer and human science, philosophy
about armbian

- Debian or Ubuntu for more than 70 boards
- More than 30 arm & arm64 kernels
- Unoffical ports for TV boxes
- Powerfull build tools
- Stable and beta packages repository
- Good reputation
about presentation

- Motives for start
- Historical overview
- Infrastructure
- Userspace
- Build engine
1. Motives for start
A board for a project
Motivation

- Disappointment
- Curiosity
- Finish the project
Project realisation
2. Historical overview
First

- Joined Cubieboards community
- Started messing with Cubietruck kernel
- Started working on a Bash build script
- Fell into a rapid development cycle
- Others started to join
Early steps

- Moved to Github
- New boards: Banana, Lime, Cubox
- Ubuntu Trusty
- Downloads from public servers
- Project hosted on @A20
Early problems and motives

- No real equipment
- No project name
- Little special knowledge

- Learning
- Helping
- Making
2014: Middle age

- armbian.com
- 17 new boards
- Jessie, Xenial: systemd
- Dedicated download server
Middle age

- Repository (aptly)
- Community forums (IPS)
- Tapatalk mobile friendly access
- Project hosting @Odroid XU4
Middle age problems

- Bad, false or nonexisting documentation
- Boards comes with its own low quality kernel & uboot
- Little to no support from chip or board makers
- Still too small group for the size of the problems
- A lot of users with little experience and high expectations
Steady growth in 2016

- 3D (MALI) and accelerated video decoding on Allwinner boards
- 24 new boards
- First ARM64 board
- eMMC boards start to show up
- dedicated build server
Present situation

- 26 new boards in 2017
- Torrent download service
- First notebook support
- Merging sources to github.com/armbian
- Adding Twitter @armbian
- Project hosting went to highend servers
Current problems

- Strong pressure on our support
- Users failing to use prepared documentation
- Users have unrealistic expectations
- Donations does not follow project expansion
- Big hardware diversity
Today and tomorrow

• we are admired 😊
• defacto standard Linux on SBC
• project might create jobs
3. Infrastructure
Brainware

- Project developers. 5-10 people
- 3rd party:
  - Linux-sunxi
  - Board makers
  - Random participant
- General knowlege community.
  - Feedback
  - Dedicated testings
  - Demand and wishes
Software

Text editor
CLl and GUI Git tools
Self developed build toolchain
Ubuntu Xenial
3rd party utils
Services

- Website www.
- Forums forum.
- Toolchain git.
- Download server dl.
- Repository. Stable apt.
  Unstable beta.
- Twitter @armbian
- IRC #armbian, #linux-sunxi @IgorPec
4. Userspace introduction
Main features

- Debian or Ubuntu
- CLI or XFCE based desktop with Chromium
- Serial console enabled by default
- Forced root password change
- Wireless enabled
Optimisations

- Reduced write frequency to save card and gain speed
- Unified boot with ramdisk and UUID
- DT overlays (Allwinner)
- Optimised DVFS
- Auto filesystem expand (ext4, btrfs)
- Headers and build essentials are installed by default
Low level tools and scripts

- armbianmonitor
- h3consumption
- armhwinfo
- firstrun
- armbian-config
armbian-config

Configuration tool for the Banana Pi running Ubuntu xenial

- **Software**: System and 3rd party software install
- **Networking**: Wireless, Bluetooth, Access point
- **System**: General system settings
- **Armbian**: Armbian specific: overlays, MOTD, loglevel
- **About**: Information about this configuration tool
Users problems

- Failed to read warnings and documentation
- Failed to understand powering issues (microUSB)
- Usage of old, low cost or fake SD cards
- Lack of basic Linux knowledge
- Unrealistic expectations
Build engine overview

- 24 source configs with up to 3 kernel branches for each SoC
- X64 Ubuntu Xenial with 11 external Linaro compilers
- Menu or parameter driven
Build engine optimizations

- apt-cacher
- Script parallelisation
- Compiler cache (CCACHE)
- Userspace remain cached
- Building is using memory
Release cycle

Daily builds

Serving

SD images

Torrent

www.armbian.com

Patch

Compiling

Build engine

Armbian

External sources

GitHub

Core team

Makers

Users

Community

Testers
Project legacy

1) Community
2) Knowledge
3) Tools
4) Universal system
5) Promoting OSS
Thank you for your attention!

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Questions before the beer? :)

www.armbian.com