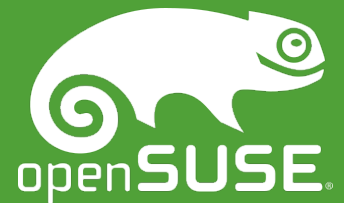


From Kickstarter Project To Linux Distributions

Parallella Technical Conference 2015

Andreas Färber
afaerber@suse.de



Overview

- Open Source Hardware vs. Open Source Software
- Kernel work
- Linux images
- U-Boot
- Epiphany
- Summary



The background features a complex geometric pattern of overlapping shapes. A large teal shape occupies the upper left, a blue shape is at the bottom left, and a green shape is on the right. These shapes are separated by white, irregular borders that create a sense of depth and movement.

Open Source

Parallella – Open Source Hardware

- Kickstarter Project
- Small startup company
- Public design files enable collaboration on hardware
 - ... and provide insights for working on system-level software



Open Source Software Deliverables

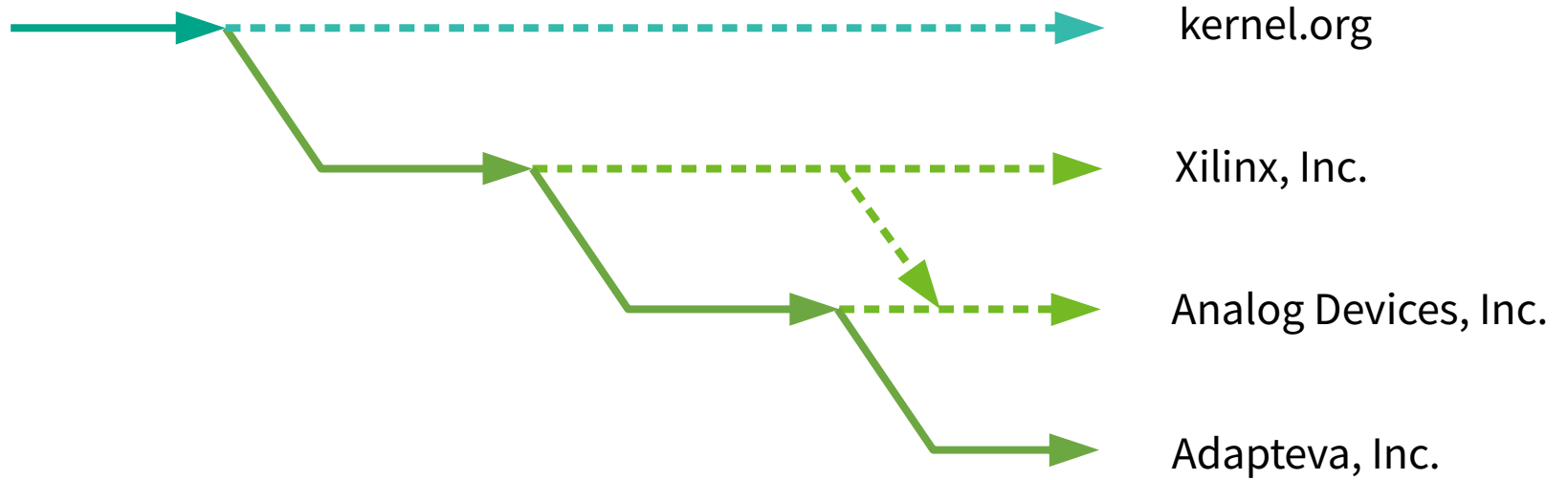
- U-Boot in QSPI flash
- “BOOT” FAT partition on SD card
 - ulmage
 - devicetree.dtb
- Ubuntu root filesystem on partition on SD card
- plus Epiphany SDK, FPGA bitstream, etc.



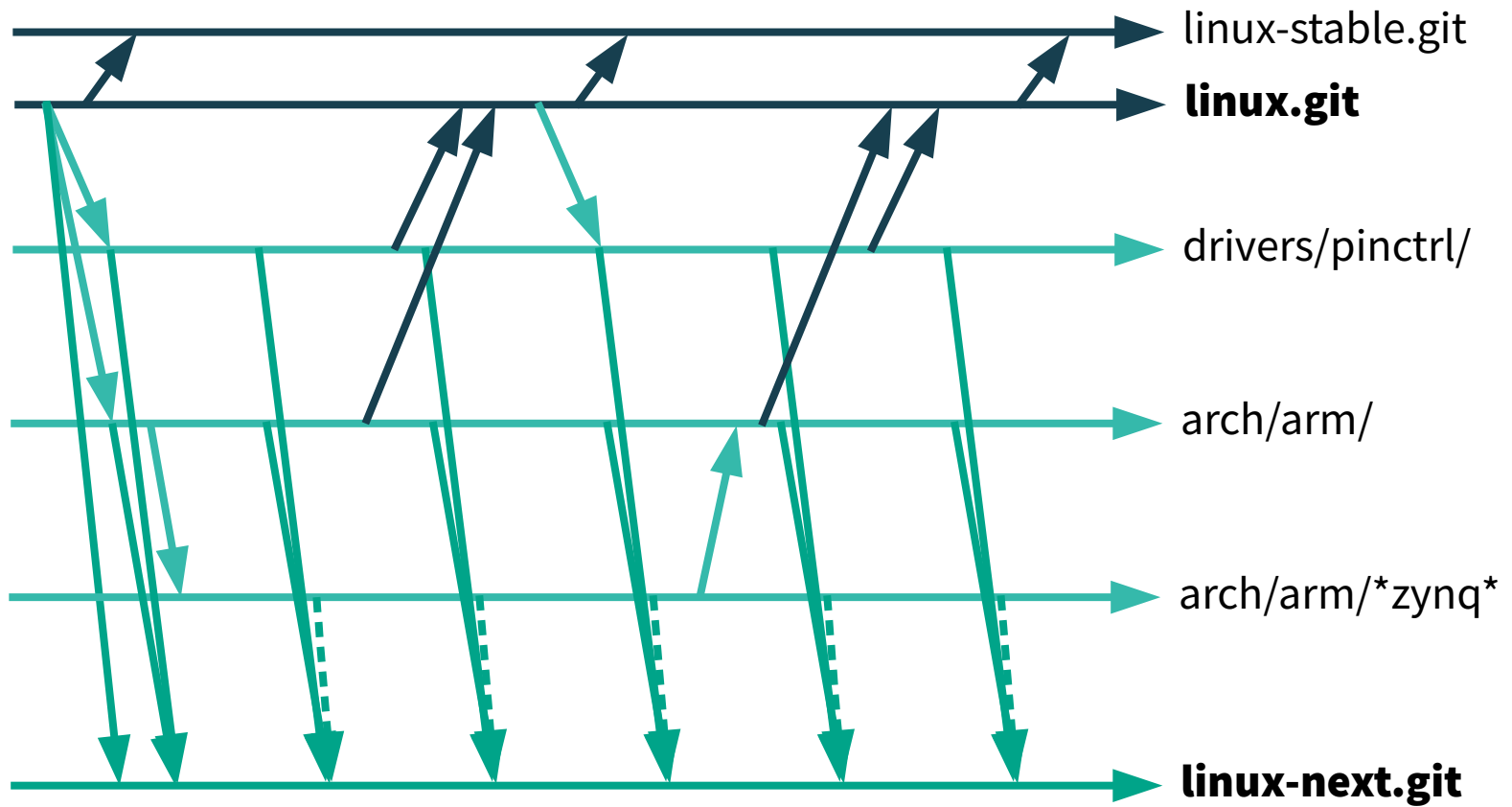


Linux Kernel

Kernel Timeline – Parallella



Kernel Timeline – Kernel Community



Kernel – Downstream Vs. Upstream

- Almost everything works
 - Serial
 - Ethernet
 - QSPI (?)
 - HDMI
 - Epiphany via /dev/mem or driver
- Little updates
 - Community-driven
 - No security process
- Basic enablement
 - Serial, Ethernet
- Still no HDMI
- No QSPI yet
 - Flash not detected?
- Epiphany via /dev/mem
 - Epiphany driver redesign?
- Pinctrl driver – e.g., LED
 - DT patches still missing?



Kernel – How You Can Help

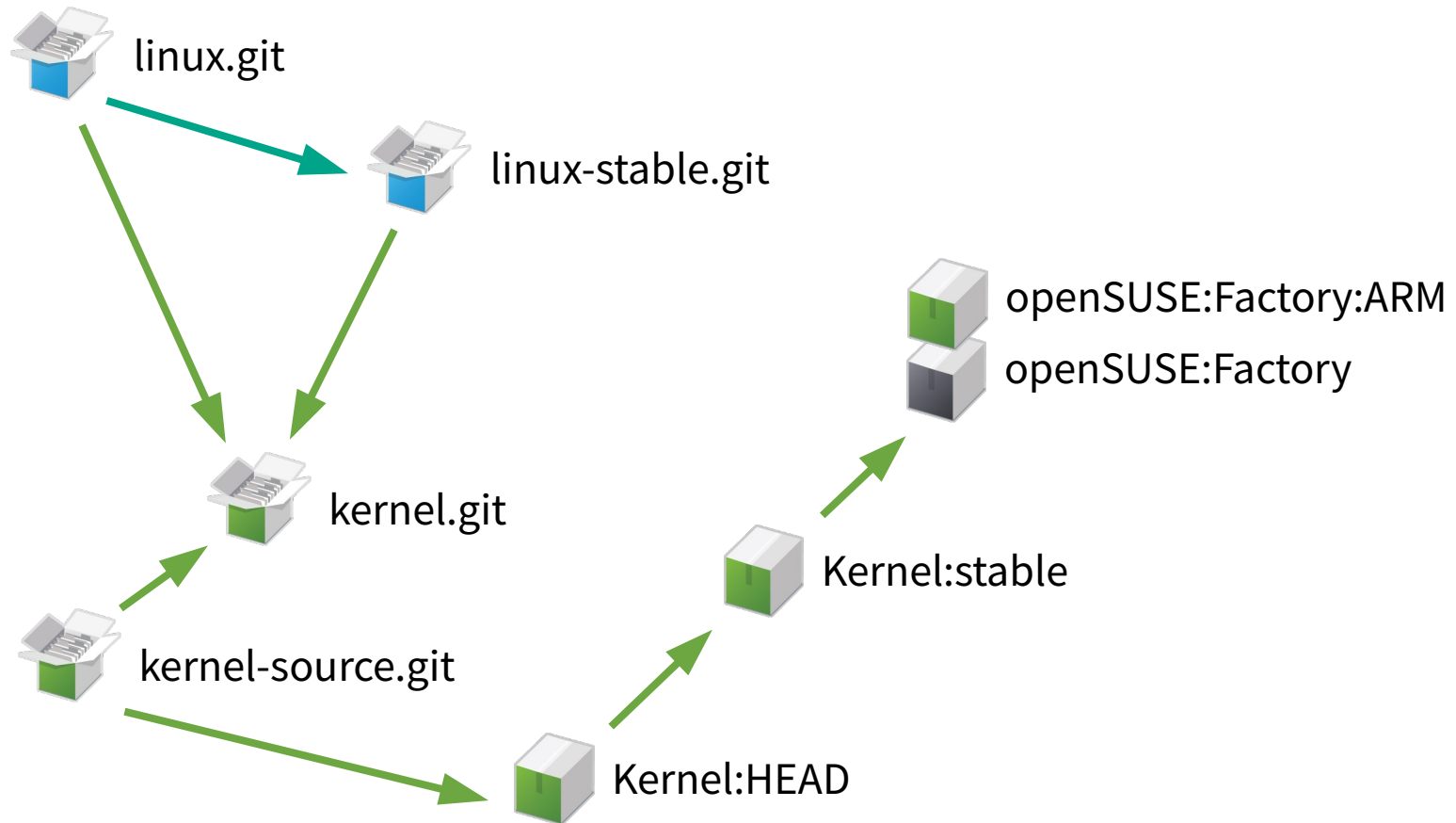
- Testers (Tested-by)
- Reviewers (Reviewed-by)
- Confirmations from the Adapteva side (Acked-by)
- More precise technical information on models
- Feedback on questions raised
- If you have patches, don't forget Signed-off-by!



openSUSE Linux Distribution

The background features a large, dark green arrow-like shape pointing right, which contains the text. To its right, a white horizontal bar connects to a light green area. Below the dark green shape is a blue shape, and to the right of the white bar is a light green area. The overall design is modern and geometric.

From kernel.org To kernel-default



Towards An Official JeOS Image

- Standardized boot.scr U-Boot boot script
 - Instead of dealing with bootargs in flash
 - Load initrd (initramfs) alongside kernel and device tree
- Filesystem that allows symlinks, e.g. ext4
 - Kernel will be symbolic link to latest/chosen version
- zImage instead of uImage – position-independent
 - Requires “bootz” command in U-Boot instead of “bootm”
- Kiwi used to build appliances from packages



Das U-Boot Bootloader

The background features a complex geometric pattern of overlapping shapes. A large teal shape on the left contains the title. To its right, a white line forms a Y-junction, separating a light green area above from a darker green area below. At the bottom, a blue shape is partially visible, and a white line continues from the teal shape's bottom edge.

Updating U-Boot

- More commands desired
 - bootz for zImage
 - ext2load (or load) for ext partitions
- Look for boot.scr by default and execute if present
- Flashing not possible from upstream Linux kernel
 - Use binary Xilinx tools, or write QSPI driver for OpenOCD?





Epiphany Tool Support

Epiphany Compiler On openSUSE

- Reuse GCC maintained by SUSE compiler team
 - Cross-compiler support for gcc5 package recently prepared
 - Note: rpmbuild(?) tries to strip target binaries with host tools
 - Still need to submit newlib Base:System → openSUSE:Factory
- Build newlib and e-lib target libraries
- Conventions needed in Makefiles
 - Don't hardcode “e-gcc”, allow for epiphany-elf-gcc or ...-x.y
 - Example: `$(CROSS_COMPILE)gcc` allows “make CROSS_COMPILE=e-”
 - Don't make assumptions about filesystem locations – allow /usr/bin



Epiphany Host Libraries

- When using upstream kernel,
stuck with last SDK version to use /dev/mem
 - Userspace software needs to be aware of kernel differences
- Discussion to move configuration data into kernel
- FPGA interface redesign – status?



Summary

The background features a large teal hexagon on the left containing the word 'Summary'. To its right is a light green hexagon, and below it is a blue hexagon. A white geometric pattern of lines connects these shapes, creating a network-like structure.

Conclusions

- Every software that needs to be manually downloaded from parallella.org is a usability issue
 - Let distros handle software management in their native way
- Offload responsibilities from Adapteva mid-term
 - Let Adapteva focus on the Epiphany and on innovation
- Kernel requires upstreaming of drivers & description
- Distro-updatable kernel may require U-Boot changes
 - No Open Source way to flash U-Boot yet?
- Distro support for Epiphany within reach!



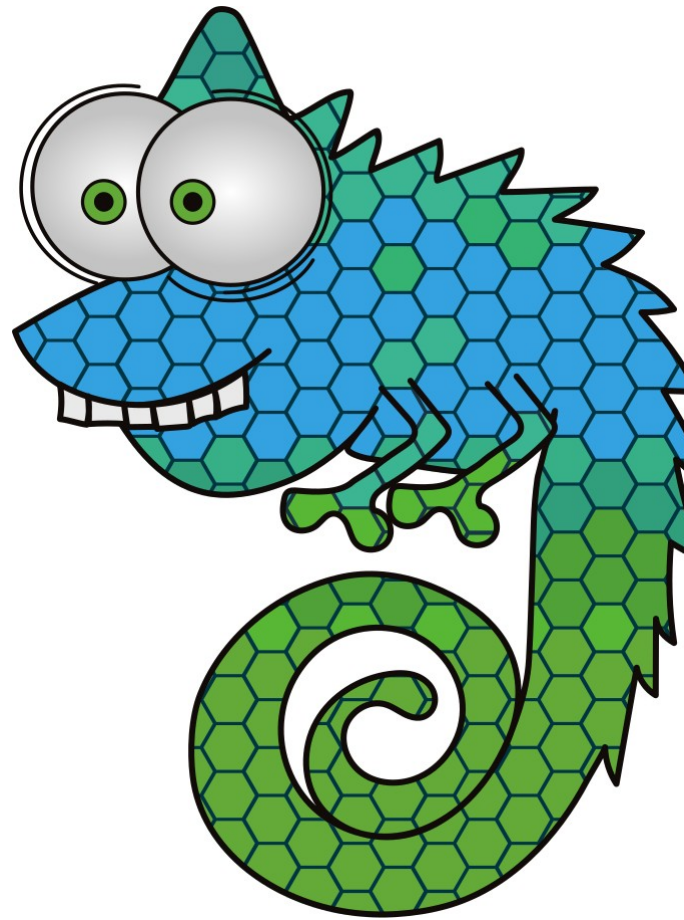


Questions?

Join us on #opensuse-arm or
opensuse-arm@opensuse.org!
en.opensuse.org/HCL:Parallella

Thank you.





Have a Lot of Fun, and Join Us At:

www.opensuse.org



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Credits

Template

Richard Brown

rbrown@opensuse.org

Design & Inspiration

openSUSE Design Team

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