News from the ARM architecture

Arnd Bergmann
1. Historic issues with ARM kernel code
2. Future directions
3. Current workflow
4. Ongoing code changes
Historic issues with ARM kernel code
History of ARM linux code, some time ago

- Strong focus on embedded systems
History of ARM linux code, some time ago

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- Lots of out of tree code
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- Aging code base
History of ARM Linux code, some time ago

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- Losing the war on complexity
History of ARM Linux code, some time ago

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- Lots of out of tree code
- Aging code base
- Losing the war on complexity
- Close to collapse
Technical problems in the ARM codebase

- Any new hardware mandates code changes
- No common platform model
- Multiple platforms mutually exclusive at compile time
- Infrastructure in hardware specific code
Management problems

- Independent vendor specific communities
- Little incentive for cooperation and peer review
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- Russell King could no longer keep up
  ⇒ Lack of pushback on crap
Management problems

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- Linus Torvalds could not keep up either
  ⇒ Lack of merging new code
Future directions
Going beyond embedded

- Desktops
- Servers
- 64 bit CPU implementation
Going beyond embedded

- Desktops
- Servers
- 64 bit CPU implementation
- One out of the two main linux architectures
Ideal architecture port

- Generic user space ABI
- Device drivers in subsystems, not subarchitectures
- Boot time hardware detection
- No mutually exclusive build time options
- Minimum kernel changes for new hardware
Current workflow
2011 direction changes

- Flattened device tree
- Single zImage for armv6/v7
- Duplicate code removal
- Moving device drivers to subsystems
- Co-maintaining arm-soc.git
Changes we did not do

- Converge on a single clean platform
- Move legacy platforms to subdir
2011 achievements

- 1 new source tree
2011 achievements

- 1 new source tree
- 2 subarch maintainer summits
2011 achievements

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- 2 subarch maintainer summits
- 3 merge windows using arm-soc.git
2011 achievements

- 1 new source tree
- 2 subarch maintainer summits
- 3 merge windows using arm-soc.git
- 4 clean new subarchitectures
## Changesets merged

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Top arm-soc contributors by changesets

174  Arnd Bergmann
78   Olof Johansson
69   Shawn Guo
65   Kevin Hilman
57   Benoit Cousson
53   Kukjin Kim
52   Tony Lindgren
51   Linus Torvalds
50   Jean-Christophe PLAGNIOL-VILLARD
46   Fabio Estevam

Total number of contributors: 236
Top contributors by non-merge changesets

69  Shawn Guo
65  Kevin Hilman
57  Benoit Cousson
50  Jean-Christophe PLAGNIOL-VILLARD
46  Fabio Estevam
43  Stephen Warren
43  Mark Brown
38  Thomas Abraham
34  Paul Walmsley
32  Kukjin Kim

Total number of contributors: 235
arm-soc maintainer role

- Sponsored by Linaro and Google
- Vendor neutral
- Define and enforce common rules for everyone
- Merging code upstream to Linus
- Coordination with Russell
- Pushing back on crap
arm-soc workflow

- Pulling many per soc topic branches
- Pushing cross-soc topic branches
- One for-next branch, rebasing
- Early staging branches
- Not quite clean allowed when doing cleanups
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- DEMO
Ongoing code changes
Multiplatform: Single zImage status

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- Breakthrough imminent
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- Progress largely invisible
- One problem at a time, across all platforms
- Focus on ARMv6 and ARMv7
Multiplatform: Single zImage status

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- Focus on ARMv6 and ARMv7
- Rob Herring has some success with two platforms
Device tree status

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- Largely converted: exynos, i.mx, tegra
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- Lots of simple device driver bindings
Randconfig builds

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- Delayed by: Arnd Bergmann <arnd@arndb.de>
- Integration into Linaro CI loop
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- Integration into Linaro CI loop
- about 150 patch series
- Regression testing
- Looking for volunteers
Memory management changes

- Continuous memory allocator
- dma.buf infrastructure
- generic iommu handling in dma-mapping API
Summary

- Lots of work getting done: device tree, consolidation, cleanup
- Not running out of work anytime soon: new platforms, ARMv8, multiplatform kernels
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- Not running out of work anytime soon: new platforms, ARMv8, multiplatform kernels
- Linux on ARM world domination coming, still busy with the details
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