

# PERIPERI BE

Brussels, Belgium

Geert Uytterhoeven

`geert@linux-m68k.org`

Glider bvba

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# Core Group Status

## Overview

- ▶ New SoC and board support for Linux
  - ▶ Upporting, rewriting, or writing from scratch
- ▶ U-Boot and ATF
- ▶ OpenOCD
- ▶ Virtualization prototype



# Core Group Status

High Level "What Happened Last Year?"

## Linux: New SoC support (clock, pinctrl, ...)

- ▶ R-Car M3N, V3H, E3
- ▶ RZ/A2M
- ▶ RZ/G1N, RZ/G1C, and RZ/G2M, RZ/G2E
- ▶ RZ/N1D

→ One new SoC per month!



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## U-Boot and ATF

- ▶ R-Car Gen3 boards, SDHI HS200
- ▶ R-Car Gen2 DM conversion (ongoing)
- ▶ ATF parameter passing (ongoing)
- ▶ PCIe recovery



# Core Group Status

Since EDI

- ▶ No new SoCs (busy with Gen4? ;-)
  - ▶ New boards (RZ/G1, RZ/G2, RZ/A2)
  - ▶ Increasing SoC/board support for recent SoCs
  - ▶ Enhancements (suspend/resume), fixes, errata
  - ▶ linux-renesas-soc archives on [lore.kernel.org](https://lore.kernel.org/)
- 
- ▶ ATF has been upstreamed!



# Core Group Status

Is Everyone Happy?



# Core Group Plan

Periupport

- ▶ PCIe error handling
- ▶ pinctrl errata
- ▶ clock errata
- ▶ Z\* clocks, PLL programming (GSX status?)
- ▶ CPUidle
- ▶ Removed GIC and INTC-EX module clocks
- ▶ R-Car M3-W ES1.2 and ES1.3 identification
- ▶ IPMMU
- ▶ TEE





# Core Group Plan

## Peripelist

- ▶ 32-bit DMA limitation
- ▶ clk: `.determine_rate()` callback
- ▶ IPMMU: more than 32-bits IOVA space
- ▶ IPMMU: suspend/resume
- ▶ R-Car H3/M3-W/M3-N TDSEL for SDHI



- ▶ Kieran became patchwork maintainer for MM patches
- ▶ Automatic delegation for most patches
  - ▶ DT, SoC, ARM → Simon
  - ▶ MultiMedia → Kieran
  - ▶ Drivers → Geert
  - ▶ Rest → Manual
- ▶ **TODO** Automatic patch status updates



# IPMMU Plan





# Plans for the next Quarters



# Virtualization Status

## What Have We Done?

- ▶ rcar-gpio pass-through PoC
- ▶ i2c pass-through PoC
- ▶ sh-sci pass-through PoC
- ▶ rcar-sata pass-through, with DMA/IPMMU
- ▶ GPIO virtualization PoC
- ▶ Investigation and documentation  
<https://elinux.org/index.php?title=R-Car/Virtualization>
- ▶ USB virtualization investigation



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→ Slow progress

- ▶ Upstream still mainly focussed on server virtualization
- ▶ Limited and buggy ARM support



# Virtualization Status

## Upstreaming

### Linux

- ▶ VFIO PM Domain support (v4.18)
- ▶ Type-1 IOMMU instantiation for IPMMU (v4.20)
- ▶ Generic reset support (blocked on DT maintainers)





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### QEMU

- ▶ Dynamic VFIO-platform devices (v3.1.0)
- ▶ Generic DT device instantiation  
New safeguards against misuse, still controversial



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+ Small bug fixes and enhancements all over the place: VFIO, reset, IPMMU, SATA Runtime PM, QEMU, ...



Feedback from Renesas?



## Feedback from Renesas?

### Next Steps?

- ▶ GPIO paravirtualization
  - ▶ Design protocol
  - ▶ Implement Linux & QEMU side
- ▶ DMA virtualization for SYS-DMAC
  - ▶ Follow "dmas" properties if no `iommu_group` is found.  
Device may be tied to multiple DMACs?
  - ▶ Para-virtualization
- ▶ ...

