

Freeing one more SoC: Etnaviv status update

X.Org Developers Conference 2015
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Slide 1 - <http://www.pengutronix.de> - 17/09/2015



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Vivante IP cores: Freeing much more SoCs

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Who's the guy in front?

- Lucas Stach
- Kernel- and graphics developer at Pengutronix
- Providing customers with stable Linux based on mainline for their projects
- Engineering made-to-measure solutions
- Helping customers to reduce long time maintenance cost by bringing things mainline



Vivante hardware implementations

- Marvell
- Freescale
- Rockchip
- HiSilicon
- Ingenic
- ICT



Etnaviv

- FOSS driver for the Vivante IP cores
- Started as a RE project by Wladimir J. van der Laan
 - A lot of the commands and ISA are known
- Contributions from others like Christian Gmeiner

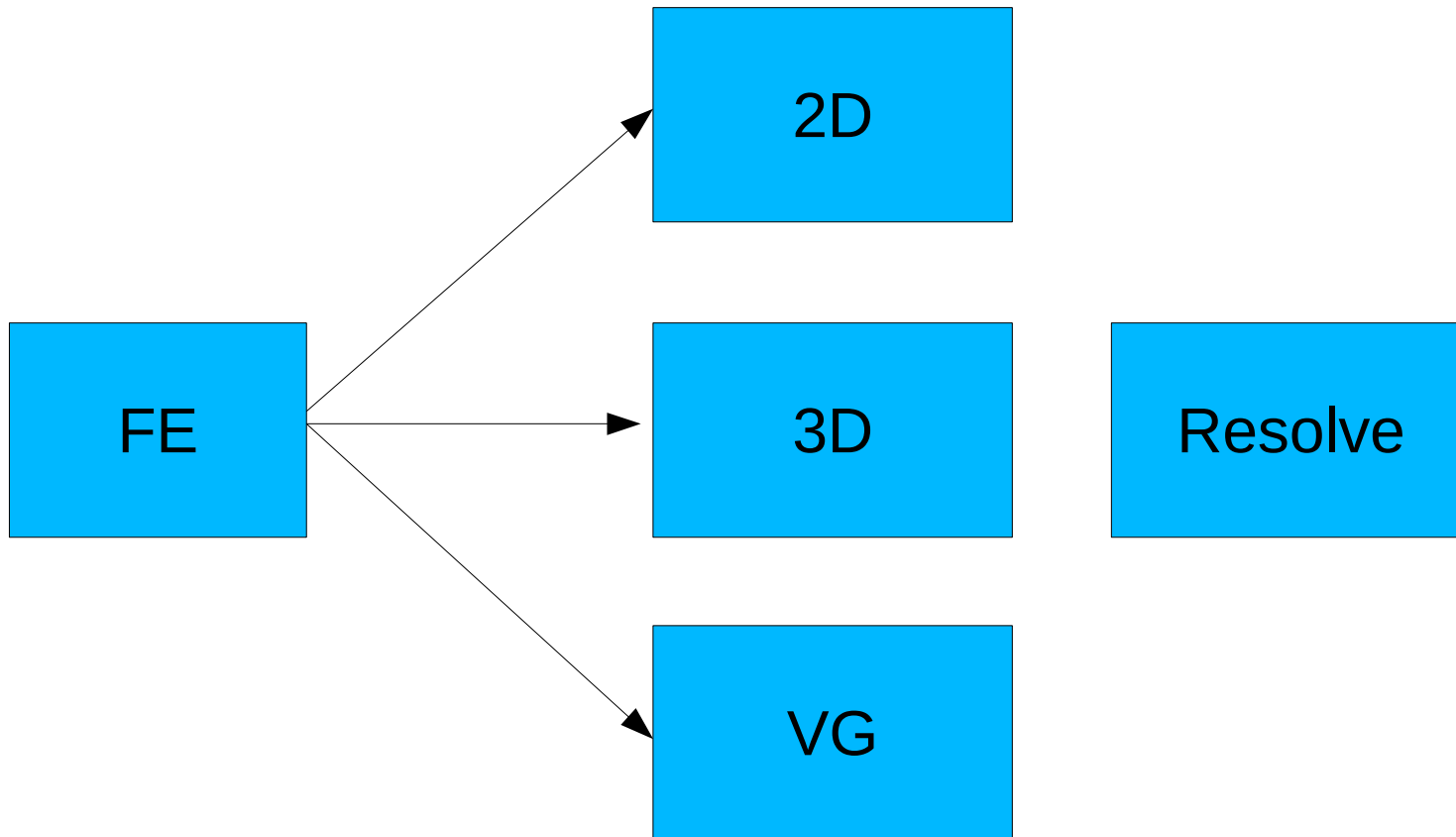


Vivante hardware

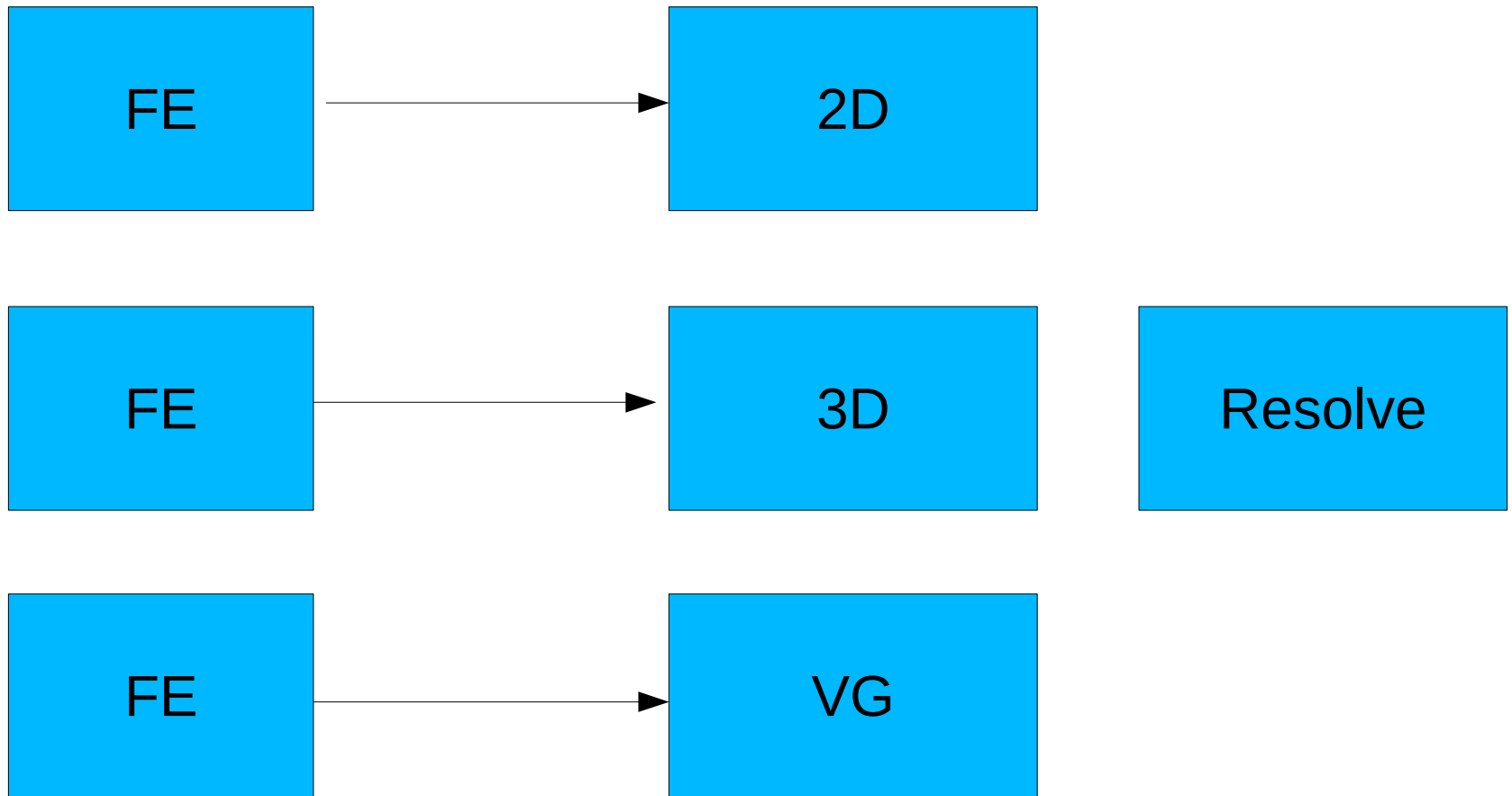
- Different IP core for 2D, 3D and VG available
- 3D core (straight-) forward renderer
- Modelled after DX9 pipeline + unified shaders
- Newer models have thread walker for compute
- Different hardware implementations



Vivante hardware configurations



Vivante hardware configurations



Vivante hardware configurations

- Multiple pixel pipes
 - Thanks to Christian for figuring out how they work
 - Growing number of tile formats
- SLI like setups



FOSS driver – why does it matter

- FOSS drivers are awesome ;)
- Integrating vendor drivers a pain point
- No security audit possible
- Driver fixes not dependable



FOSS driver – why does it matter

- Freescale i.MX6 used in a lot of automotive and industrial applications
- Industrial chip lifetime
- i.MX6 has a guaranteed availability for 15 years
- Last newly build devices with this chip may ship in 2027



Etnaviv status - kernel

- Christian Gmeiner started kernel work in 2014
- Clone of Freedreno kernel adapted to Vivante HW
- Currently in state of RFCv2



Etnaviv status – kernel RFCv2

- Significantly reworked UAPI
- Proper cache handling for non-coherent archs
- Lots of stability improvements
- GPU suspend/resume possible



Etnaviv status - kernel

- Replaced fat and obfuscated Vivante kernel driver
- Readable code
- 60+ KLOC → 6.5 KLOC



Etnaviv status – kernel missing features

- Use of core internal DVFS
- Working and secure command stream validation
- Support for per-client MMU contexts
- Support for MMUv2
- Performance counters



Etnaviv status – X.Org

- Xf86-video-armada is able to drive 2D GPU
- Mostly developed by Russell King
 - Vivante galcore lib
 - libetnaviv on top of Vivante kernel driver
 - etna-drm
- Using 2D GPU
- Provides solid acceleration of common operations
- X-Video accel



Etnaviv status – libdrm

- Again started by Christian as Freedreno clone
- Rewritten to deal with the new kernel UAPI
- Some cleanups missing otherwise ready for review



Etnaviv status – MESA

- Started by Wladimir on top of the Vivante kernel driver and libetna
- Reworked to work on top of etna-drm
- Able to run simple Applications
(yes, Quake 3 might be one of them)



Etnaviv status – MESA TODOs

- Get rid of FBDEV
 - Implement fused EGL device?
 - Put EGL device on top of KMS (EGL streams? *shudder*)
- Clean up state validation and emission
- Shooting Piglits



Questions?

