Nouveau : what's new ?

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Introduction

- Nouveau was started in June 2005
- And announced last year at fosdem 2006
- Purpose: support advanced features (in particular 3D) in an open source Nvidia driver
- Nvidia hardware is powerful but complex
  - ... and undocumented
- Targets NV04 up to NV50
  - TNT up to GeForce 8800
    - 10 years range
Introduction

- Driver with no legacy
  - Ability to try new things
  - Requires a kernel module, even for 2D
  - Plan to move modesetting to the kernel
  - Do not freeze the interfaces until they are stable
Last year/This year

• One developer/Half a dozen core developers
• Unknown project/Lots of interest
• No specs/Reverse engineered specs
• Modified nv driver/driver that runs basic (untextured) 3D apps

=> what happened ?
Community building

- Lots of people, lots of contributions
- Bi-weekly development update (irregular nouveau development companion)
  - Keep users updated
  - Show people how drivers work
  - More importantly, prove that we are not slacking!
Reverse engineering

- **Renouveau**
  - Introduced last year at fosdem
  - Fully user space, non-root
  - Tracks fifo changes
  - Able to track all user-space submitted hardware commands

- **Kmmio-trace**
  - Kernel-based tracer
  - Very new
  - Traps iomaps
  - Generates page fault
  - Catches what renouveau can't catch
Reverse engineering

- Renouveau helped us figure out most 3D functionality
  - Very simple tool
  - Lots of people helped
  - Most 3D functionality is known from nv04 up to nv40 (nv50 pending)
  - But that's not enough...
Past developments

- Kernel driver
  - Hardest part
  - Context switching required heavy reverse engineering
    - Required kernel tracing (kmmio trace)
  - Lots of card-specific bits
Past developments

• 2D driver
  • Based on the “nv” driver
  • Moved init code to the kernel
  • Deobfuscated
  • EXA support
  • Support for 3D
Past developments

- **3D driver**
  - Wrote a 3D driver from scratch
  - Basic 3D support for nv40
    - Untextured polygons
    - glxgears and other simple applications run

![x86 gears](image1.png)

![PPC gears](image2.png)
Current developments

- Randr 1.2
  - Partially working on nv28
  - Only analog outputs ATM
Current developments

- NV04 support
  - Not just for fun
  - See how far we can stretch it

- NV10 -> NV30 support
  - DRI mostly ok
  - Now requires kernel support
Future developments

- Texturing support
  - Will require TTM support
  - In turn, requires multiple context support in the TTM
  - Complex
  - Hard to do
Future developments

- Debug PPC issues
- Get 3D to work on NV04/NV10/NV20/NV30
  - Requires in-kernel context switching support
- Get randr 1.2 to work
  - Then move modesetting to the kernel
- Add solid Xv support
  - DMA for Xv
  - XvMC, who knows?
- Keep the driver unified!
Conclusion

• Lots of support from people
• New reverse engineering tools
  • In particular, in-kernel
  • Good tools help the development
  • Basic 3D works
  • Now, add texturing support
    • Yes, quake3 is the next milestone
    • But that will require porting to the TTM
  • The tools apply to other driver as well!
    • Interest from the Radeon guys
    • What do we RE next?
Conclusion

«It's so hard to write a graphics driver that open-sourcing it would not help [...] In addition, customers aren't asking for open-source drivers.»

Andrew Fear, Nvidia software product manager.

Questions?

http://nouveau.freedesktop.org

#nouveau on freenode