

# Nouveau

Recap, on-going and future work

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# Summary

1 Introduction

2 Kepler support

3 Kernel

4 Userspace

5 Tools

6 Community

# Introduction

## Introduction

- Last nouveau update was at FOSDEM 2012;
- Many improvements since then :).

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# Kepler support

## Kepler

- New NVIDIA card family released in March 2012;
- Modesetting support released on the same day;
- Un-released 3D support happened a few days later;
- 2D/3D accel support released less than a month after (after libdrm2).

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  - Optimus/prime
  - Power Management
- 4 Userspace
- 5 Tools
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# Kernel updates

## Kernel updates

- Nouveau left staging (Linux 3.4);
- Major internal re-architecturing, called core (Linux 3.7);

## The core architecture

- Separate code per-chipset;
- Can partially be used from the userspace;
- Kind of object-oriented (ctor, dtor, init & fini);
- Should limit regressions when adding support to new cards;
- Contribution by Ben Skeggs.

# Optimus/prime

## Optimus/Prime support

- Offloading support added by Dave Airlie in Linux 3.9;
- Synchronisation between drivers, worked on by mlankhorst;

## More information + how to

<http://nouveau.freedesktop.org/wiki/Optimus/>



# Power Management

## Thermal management

- Temperature monitoring support added for most cards;
- Except for the i2c-only temperature probes.

## Fan management

- Static fan management added in Linux 3.7;
- Experimental automatic fan management added in Linux 3.9;
- Enabled by default in Linux 3.13;
- Doesn't work on all Keplers...

Contact Martin Peres (mupuf) if you have problems!

# Power Management

## Reclocking

- Still a work in progress...;
- Will provide much better performance!

## Power and clock gating

- Will lower the power consumption (good for laptops);
- Should be released soon for Fermi/Kepler.

## Performance and power monitoring

- Some Kepler have i2c power sensors!
- Rough engine-usage indicators (Memory, Graph, Video);
- Will be exposed ASAP.

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  - Libdrm\_nouveau2
  - Video decoding
  - OpenGL
  - Direct 3D
  - Performance counters
- 5 Tools
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# Performance counters

## DONE

- MP-counters support for Fermi+;
- Exposed through Gallium-HUD;
- Kepler support by Christoph Bumiller;
- Fermi support by Samuel Pitoiset (GSOC 2013).

## WIP

- Performance monitoring from PDAEMON(Mem, VDec, GR);
- Reverse engineering graphics-related signals on W7 (Samuel);

# Userspace updates - Libdrm\_nouveau2

## Libdrm\_nouveau2

- Expose BOs' VM addresses;
- Support multiple threads per channel;
- Rework the relocation mechanism;
- Reduce the occurrences of -ENOSPC;
- Released in April 2012 by Ben Skeggs.

## Libdrm\_nouveau2 : Mesa updates

- Mesa drivers updated to use Libdrm\_nouveau2;
- Nvfx rewritten and renamed nv30;
- Various fixes to the other drivers.

# Userspace updates - Video decoding

## Video decoding : Maarten Lankhorst

- Fermi+ support added by Maarten Lankhorst;
- Rely on user-extracted firmwares (mmiotrace).

## Video decoding : Ilia Mirkin

- Nv50: Full VP2/3/4 support added by Ilia Mirkin;
- Wrote a script to extract firmwares from the blob;
- Added back support for video planes on (nv04-40);
- PMPEG support for MPEG1/2 on nv40-96.

## More information

<http://nouveau.freedesktop.org/wiki/VideoAcceleration>

# OpenGL

## History: GL version support

- OpenGL 3.0 in Mesa 8.0 (nvc0);
- OpenGL 3.1 in Mesa 9 (nvc0);
- OpenGL 3.3 support in Mesa 10.1 for nv50/nvc0.

## Limited support

- GK110;
- GK208.

# Nine: a d3d9 state tracker

## Nine: a d3d9 state tracker

- Started by Joakim Sindholt;
- Completed by Christoph Bumiller
- Runs Skyrim, Civilization 5, Anno 1404 and StarCraft 2;
- Up to 2 times faster than Wine's d3d implementation.

## Announcement

<http://lists.freedesktop.org/archives/mesa-dev/2013-July/041900.html>

## Source tree

<https://github.com/chrisbmr/Mesa-3D/tree/gallium-nine>



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- Envytools repo moved
- RESTification of the documentation
- Falcon C Compiler
- Falcon & other NVIDIA ISAs Decompiler!

## 6 Community

# Envytools

## Envytools

- is a collection of nvidia-related tools and docs;
- was primarily hosted by Pathscale;
- but was also hosted by mwk & sourceforge;
- moved to one repo with every dev as admins.

## More information

<http://lists.freedesktop.org/archives/nouveau/2013-July/013089.html>

# Envytools : documentation

## hwdocs before

- text-based documentation of NVIDIA hw;
- links written as plain text.

## hwdocs after

- text-based documentation of NVIDIA hw;
- can generate pretty html documentations.
- Example: <http://envytools.readthedocs.org>.

# Falcon C compiler

## Falcon C compiler

- Started by Shinpei Kato;
- work for PGRAPH firmwares;
- can be extended to support PDAEMON.

## Links

- Source: <https://github.com/CS005/guc>
- Paper: <http://hgpu.org/?p=10251>

# NVIDIA ISAs decompiler

## decompiler

- Decompiler project started by Marcin Kościelnicki;
- Works on vp2macro and partial support of Falcon;
- Will support xtensa & possibly vuc;
- Will be released after Marcin's master thesis (soon);
- Example: <http://ng.0x04.net/~mwk/deco.txt>.

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- 6 **Community**
  - Bugzilla cleaning
  - Wiki portage & rewrite
  - New member!?

# Community

## Bugzilla cleaning

- Started by Ilia Mirkin;
- closed all bugs not updated since 2011;
- asking people to reproduce on current Nouveau;
- Reduced bug reports from 410 to 167;
- Helped fixing some actual bugs along the way.

# Community

## Wiki portage

- Freedesktop moved to ikiwiki;
- killed a lot of spam along the way;
- but it is now harder to add content.

## Wiki clean up & rewrite

- Started by Ilia Mirkin & Martin Peres;
- Rewrote all the main pages to make them helpful;
- deleted the old cruft.



# Community - Welcome NVIDIA!

## Flash news

- NVIDIA released NDA-free documentation during XDC2013!;
- Offered us a contact email to answer questions;
- Are willing to improve the out-of-the-box experience of users;
- Provided documentation on the DCB-related vbios tables;
- Helped us get MSI IRQs working and fix video decoding;
- Released a GPL Tegra K1 driver with extensive reg dumps;
- Welcome to the Nouveau community, NVIDIA!