Nouveau
Recap, on-going and future work

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Nouveau developers (or related)

February 2, 2014
Summary

1. Introduction
2. Kepler support
3. Kernel
4. Userspace
5. Tools
6. Community
Introduction

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

- 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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3. Kernel
   - Optimus/prime
   - Power Management
4. Userspace
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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 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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   - Performance counters
   - Libdrm_nouveau2
   - Video decoding
   - OpenGL
   - Direct 3D
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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);
- Export the kernels
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
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

- 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


Source tree

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

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

2. Kepler support

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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

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;

hwdocs future

- rnndb generated from the ReST documentation;
- cross referencement of registers and bitfields.
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 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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   - Bugzilla cleaning
   - Wiki portage & rewrite
   - New member!?
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.
Wiki portage & rewrite

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;
-帮忙我们解决MSI IRQs问题并修复视频解码;
- Released a GPL Tegra K1 driver with extensive reg dumps;
- Sent an RFC to support the Tegra K1 driver in Nouveau;
- Welcome to the Nouveau community, NVIDIA!