

VKMS improvements using IGT GPU Tools

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Mentors: Rodrigo Siqueira and Trevor Woerner

Melissa Wen

melissawen.github.io



MSc Student - Last Semester - University of São Paulo

GSoC 2020 Student for X.Org Foundation

Linux Kernel Contributor

VKMS Maintainer - DRM Subsystem

Melissa Wen

VKMS improvements using IGT GPU Tools

Just a recap

[Virtual Kernel Modesetting — The Linux Kernel documentation](#)

VKMS is a software-only model of a KMS driver

+

[IGT GPU Tools](#)

Test suite and tools for DRM/KMS drivers

VKMS improvements using IGT GPU Tools

Primary Goal: Deliver a fully working and bug-free subset of GPU tests.

kms_cursor_crc from piglit

Status	Sequential
skip	236
fail	6
warn	1
pass	3
total	246

VKMS improvements using IGT GPU Tools

Primary Goal: Deliver a fully working and bug-free subset of GPU tests.

kms_cursor_crc from piglit

Status	Sequential	Individual
skip	236	236
fail	6	2
warn	1	1
pass	3	7
total	246	246

Sorting the issues

Skipped tests: 236 test cases
Test requirement not met

"Mood swings": Cross-cutting
Instability in sequential execution

Real failures: 3 test cases
pipe-A-cursor-alpha-transparent
pipe-A-cursor-dpms
pipe-A-cursor-suspend

Skipped tests

Test requirement not met in function `run_tests_on_pipe`, file `../tests/kms_cursor_crc.c:741`:

Test requirement: `w <= data->cursor_max_w && h <= data->cursor_max_h`

Test requirement not met in function `igt_require_pipe`,
file `../lib/igt_kms.c:1900`:

Test requirement: `!(display->pipes[pipe].enabled)`

Pipe B does not exist or not enabled

Skipped tests

[Increasing test coverage in VKMS - max square cursor size | Wen.onweb](#)
[drm/vkms: change the max cursor width/height](#)

Test requirement not met in function `run_tests_on_pipe`, file `../tests/kms_cursor_crc.c:787`:
Test requirement: `has_nonsquare_cursors(data)`

Test requirement not met in function `igt_require_pipe`,
file `../lib/igt_kms.c:1900`:
Test requirement: `!(display->pipes[pipe].enabled)`
Pipe B does not exist or not enabled

"Mood swings" in sequential execution

Subtest pipe-A-cursor-size-change: SUCCESS
Subtest pipe-A-cursor-alpha-opaque: FAIL
Subtest pipe-A-cursor-alpha-transparent: FAIL
Subtest pipe-A-cursor-dpms: FAIL
Subtest pipe-A-cursor-suspend: FAIL
Subtest pipe-A-cursor-64x64-onscreen: FAIL
Subtest pipe-A-cursor-64x64-offscreen: FAIL
Subtest pipe-A-cursor-64x64-sliding: FAIL
[...]



FAIL!!

"Mood swings" in sequential execution

```
Subtest pipe-A-cursor-size-change: SUCCESS
Subtest pipe-A-cursor-alpha-opaque: FAIL .....SUCCESS
Subtest pipe-A-cursor-alpha-transparent: FAIL
Subtest pipe-A-cursor-dpms: FAIL
Subtest pipe-A-cursor-suspend: FAIL
Subtest pipe-A-cursor-64x64-onscreen: FAIL ...SUCCESS
Subtest pipe-A-cursor-64x64-offscreen: FAIL ..SUCCESS
Subtest pipe-A-cursor-64x64-sliding: FAIL ....SUCCESS
[...]
```

First Target: the IGT test

Subtest pipe-A-cursor-size-change: SUCCESS
Subtest pipe-A-cursor-alpha-opaque: FAIL
Subtest pipe-A-cursor-alpha-transparent: FAIL
Subtest pipe-A-cursor-dpms: FAIL
Subtest pipe-A-cursor-suspend: FAIL
Subtest pipe-A-cursor-64x64-onscreen: FAIL
Subtest pipe-A-cursor-64x64-offscreen: FAIL
Subtest pipe-A-cursor-64x64-sliding: FAIL
[...]

Guilty!

Skipping cleanup
when a test case fails

First Target: the IGT test

Subtest pipe-A-cursor-size-change: FAIL

Subtest pipe-A-cursor-alpha-opaque: SUCCESS

Subtest pipe-A-cursor-alpha-transparent: FAIL

Subtest pipe-A-cursor-dpms: FAIL

Subtest pipe-A-cursor-suspend: FAIL

Subtest pipe-A-cursor-64x64-onscreen: SUCCESS

Subtest pipe-A-cursor-64x64-offscreen: FAIL

Subtest pipe-A-cursor-64x64-sliding: SUCCESS

[...]

First Target: the IGT test

Setting the pace

```
static void prepare_crtc(data_t *data, igt_output_t *output, int cursor_w, int cursor_h)

    if (data->pipe_crc)
        igt_pipe_crc_free(data->pipe_crc);
    data->pipe_crc = igt_pipe_crc_new(data->drm_fd, data->pipe,
                                    INTEL_PIPE_CRC_SOURCE_AUTO);
    [...]
    igt_wait_for_vblank(data->drm_fd, data->pipe_crc);
    igt_pipe_crc_start(data->pipe_crc);
```

[test/kms_cursor_crc: release old pipe_crc before create a new one](#)

[test/kms_cursor_crc: align the start of the CRC capture to a vblank](#)

Waiting for feedback... Move on

Real failures

Subtest pipe-A-cursor-dpms: FAIL

Not so real:

Date: Thu Sep 6 08:18:26 2018

drm/vkms: Compute CRC with Cursor Plane

This patch compute CRC for output frame with cursor and primary plane. Blend cursor with primary plane and compute CRC on the resulted frame.

This currently passes cursor-size-change, and cursor-64x64-[onscreen, offscreen, sliding, random, dpms, rapid-movement] from [igt kms_cursor_crc tests](#).

Waiting for feedback... Move on

Subtest pipe-A-cursor-dpms: FAIL

When did things change?

Date: **Fri Jul 19 17:23:13 2019** +0200

drm/vkms: Use wait_for_flip_done

It's the recommended version, wait_for_vblanks is a bit a hacky interim thing that predates all the flip_done tracking. It's unfortunately still the default ...

+++ Feedbacks

IGT test: not guilty!

Debugging... Debugging... Co-debugging...

DRI Community

- + ftrace
- + dmesg: logs + pr_info
- + ctags
- + [kworkflow](#)

Many attempts and feedback

- ✗ flip_done vs wait_for_vblank
- ✗ [drm/vkms: add missing drm_crtc_vblank_put to the get/put pair on flush](#)
- ✗ change commit_tail sequence:
modeset_disable ➔ modeset_enable ➔ commit_plane

We found it

[\[PATCH\] drm/vkms: guarantee vblank when capturing crc](#)

Subtest pipe-A-cursor-size-change: **SUCCESS**

Subtest pipe-A-cursor-alpha-opaque: **SUCCESS**

Subtest pipe-A-cursor-alpha-transparent: FAIL

Subtest pipe-A-cursor-dpms: **SUCCESS**

Subtest pipe-A-cursor-suspend: **SUCCESS**

Subtest pipe-A-cursor-64x64-onscreen: **SUCCESS**

Subtest pipe-A-cursor-64x64-offscreen: **SUCCESS**

Subtest pipe-A-cursor-64x64-sliding: **SUCCESS**

[...]

Real failures: The last one

Subtest pipe-A-cursor-size-change: SUCCESS

Subtest pipe-A-cursor-alpha-opaque: SUCCESS

Subtest pipe-A-cursor-alpha-transparent: FAIL

Subtest pipe-A-cursor-dpms: SUCCESS

Subtest pipe-A-cursor-suspend: SUCCESS

Subtest pipe-A-cursor-64x64-onscreen: SUCCESS

Subtest pipe-A-cursor-64x64-offscreen: SUCCESS

Subtest pipe-A-cursor-64x64-sliding: SUCCESS

[...]

Real failures: The last one

Subtest pipe-A-cursor-size-change: SUCCESS

Subtest pipe-A-cursor-alpha-opaque: SUCCESS

Subtest pipe-A-cursor-alpha-transparent: WARNING

Subtest pipe-A-cursor-alpha-transparent

WARNING: CRC value is all zero.

Subtest pipe-A-cursor-dpms: SUCCESS

Subtest pipe-A-cursor-suspend: SUCCESS

Subtest pipe-A-cursor-64x64-onscreen: SUCCESS

Subtest pipe-A-cursor-64x64-offscreen: SUCCESS

Subtest pipe-A-cursor-64x64-sliding: SUCCESS

[...]

Real failures: The last one

TO-DO: Alpha-blending

Formula from DRM Documentation:

$$\text{out.rgb} = \text{plane_alpha} * \text{fg.alpha} * \text{fg.rgb} + (1 - (\text{plane_alpha} * \text{fg.alpha})) * \text{bg.rgb}$$

Subtest pipe-A-cursor-alpha-opaque: SUCCESS

Subtest pipe-A-cursor-alpha-transparent: SUCCESS

Real failures: The last one

Asking for trouble...

Kind of subtest pipe-A-cursor-alpha-translucent (alpha = 0.5) **FAIL!**

OUCH!

Updating TO-DO: Premultiplied Alpha-Blending

```
out.rgb = plane_alpha * fg.rgb + (1 - (plane_alpha * fg.alpha)) * bg.rgb
```

Real failures: The last one

Asking for trouble...

Kind of subtest pipe-A-cursor-alpha-translucent (alpha = 0.5) **FAIL!**

OUCH!

Updating TO-DO: Premultiplied Alpha-Blending

```
out.rgb = plane_alpha * fg.rgb + (1 - (plane_alpha * fg.alpha)) * bg.rgb
```

RTFM

Real failures: The last one

Asking for trouble...

Kind of subtest pipe-A-cursor-alpha-translucent (alpha = 0.5) **FAIL!**

OUCH!

Updating TO-DO: Premultiplied Alpha-Blending

```
out.rgb = plane_alpha * fg.rgb + (1 - (plane_alpha * fg.alpha)) * bg.rgb
```

Each patch to its due project

[drm/vkms: add alpha-premultiplied color blending](#)

[\[i-g-t\] tests/kms_cursor_crc: refactoring cursor-alpha subtests](#)

Conclusions

Before

Status	#
skip	236
fail	6
warn	1
pass	3
total	246

After

Status	#
skip	221
fail	0
warn	0
pass	18
total	246

- + Sequential execution of test cases is stable
- + Added feature: alpha-blending

Side quests

Writeback:

- add support to VKMS
- IGT Test: kms_writeback

Patch review

Improvements for KWorkFlow: [Melissa's PR](#)

What is next?

The newest VKMS maintainer

Road-map:

- **Think about CI for VKMS**
Check some ideas...
- **Add overlay support + IGT**

Questions?

Melissa Wen

melissawen.github.io

linkedin.com/in/melissa-srwen

IRC: melissawen: #dri-devel, #xorg, #xorg-devel