

ORACLE®

# Status of DRM KMS drivers in Solaris

- Randy Fishel
- Principal Software Engineer
- Solaris x86 Platform Engineering
- September 18, 2015

# Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

# Status of DRM KMS Drivers in Solaris

- 1 · Introduction
- 2 · History of DRM Drivers in Solaris
- 3 · Status of Current DRM Drivers
- 4 · Future Work
- 5 · How to Work Better

# Status of DRM KMS Drivers in Solaris

- 1 · Introduction
- 2 · History of DRM Drivers in Solaris
- 3 · Status of Current DRM Drivers
- 4 · Future Work
- 5 · How to Work Better

# Who am I

# Who am I

rfishel pts/15 Sep 11 07:47 (grimmy)

# Who am I

rfishel pts/15 Sep 11 07:47 (grimmy)

randyf pts/1 Sep 11 07:51 (localhost)

# Who am I

rfishel pts/15 Sep 11 07:47 (grimmy)

randyf pts/1 Sep 11 07:51 (localhost)

randy.fishel@oracle.com

# Status of DRM KMS Drivers in Solaris

- 1 · Introduction
- 2 · History of DRM Drivers in Solaris**
- 3 · Status of Current DRM Drivers
- 4 · Future Work
- 5 · How to Work Better

# History of DRM KMS Drivers in Solaris

- Framebuffer drivers were originally kernel modules
  - Hardware was pretty simple
  - Source could be contained in a single (easily managed) file
  
- That was a long time ago,

# History of DRM KMS Drivers in Solaris

DRM KMS drivers introduced in Solaris in 2006

- OpenSolaris produced lots of interest for lots of hardware
- Sun created a team in China to produce and manage drivers
  - Mostly x86 drivers
  - Not only framebuffer, but network, usb, storage
- I915 was the first KMS driver
- No information as to the original drm/i915 source base

# History of DRM KMS Drivers in Solaris

- DRM used only in two drivers
  - i915
  - efb

Legacy Radeon based hardware to support move to Xorg  
Work (though stalled) underway to support newer Radeon  
hardware

# History of DRM KMS Drivers in Solaris

- By 2010 Solaris as a desktop OS was in decline
  - Business directions favored Solaris as a server OS
  - Not sufficient resources to keep up with other vendors
- Post Oracle acquisition desktop was primarily for developers
  - Driver support for only hardware available on Oracle systems or embedded in machines that Oracle developers use.
- By 2011, most of China driver team reassigned or released

# History of DRM KMS Drivers in Solaris

- In 2011 drm/i915 development moved to Santa Clara with assistance from a single Intel engineer.
- In early 2012 I was asked to help with i915
- Source primarily came from Intel
- Solaris team provided testing, bugfixing, and process support
- By mid 2013 process was optimized to allow for quarterly releases
- Solaris driver was very stable and supported chipsets to Haswell

# History of DRM KMS Drivers in Solaris

- In early 2014 Intel stopped being in the middle suggesting that Oracle get the driver source from the community and do the porting

# History of DRM KMS Drivers in Solaris

Migration from previous driver to Community driver-

- First task was to remove the driver from the OS base and move it to the X consolidation
  - Driver source closer to it's X counterparts
  - New organization more knowledgeable about graphics stack
  - Better ability to share work with the community
- By early 2015 all drm based drivers available with X
- In April the team started to port the community source to Solaris

# Status of DRM KMS Drivers in Solaris

- 1 · Introduction
- 2 · History of DRM Drivers in Solaris
- 3 · Status of Current DRM Drivers**
- 4 · Future Work
- 5 · How to Work Better

# Status of Current DRM Drivers

- Current shipping driver fully supports Intel CPU's to Haswell
-

# Status of Current DRM Drivers

- Current porting work based on community's April snapshot
  - Primary goal: Make it work however necessary
  - Secondary goal: Try to do it in a way where we might be able to contribute changes back to the community
    - Structure work so that it aligns as closely as possible to community source

# Status of Current DRM Drivers

- Interesting discoveries:
  - Significant structural difference between our stable sources and the community sources
  - Our drm had only the necessary items to support i915 and efb, making it difficult for Radeon porting
- Not so unexpected discoveries:
  - Lots of Linux-centric code

# Status of Current DRM Drivers

- But...

We have a fully working version of the driver to use as a reference!

# Status of Current DRM Drivers

- As of September:
  - drm mostly ported
    - Compiles clean (no errors, no warnings)
    - A fair amount of cleanup still to be done as well as a small set of empty stubs
    - A fair amount of Solaris-specific code, but most contained within wrappers.
    - But a fair amount of unimplemented components

# Status of Current DRM Drivers

## - I915

- Mostly complete, compiles clean (no errors, no warnings)
- Slightly more difficult due to size and structural differences
- Lots of cleanup needed

# Status of Current DRM Drivers

- Some of the challenges
  - Memory allocation
    - Most notable: Solaris “free” takes two arguments
    - Solaris DMA memory uses handles
  - A number of features that have conflicting Solaris equivalents
  - Turning some of the more un-obvious Linux-specific features into Solaris equivalents
  - Compiler-specific features

# Status of DRM KMS Drivers in Solaris

- 1 · Introduction
- 2 · History of DRM Drivers in Solaris
- 3 · Status of Current DRM Drivers
- 4 · Future Work**
- 5 · How to Work Better

# Future Work

- Continue to work with community sources
  - Migrate from April snapshot to more recent snapshot
- Fix/update some of the deferred components
- Re-investigate the Solaris features for better usage
- Contribute as much as feasible back to the community

# Status of DRM KMS Drivers in Solaris

- 1 · Introduction
- 2 · History of DRM Drivers in Solaris
- 3 · Status of Current DRM Drivers
- 4 · Future Work
- 5 · How to Work Better

# How to Work Better

# How to Work Better

- Cooperation

# How to Work Better

- Nota Bene
  - We're not asking the community to make changes, but to endorse us as we make those changes that make sense

# Questions

# Safe Harbor Statement

The preceding is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

ORACLE®