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The FreeBSD Project

The X.Org Developer's Conference, 2014





Introduction

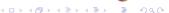
Structure of this presentation

- Our major problems
- For each problem, planned solutions

For the 2 or 3 people in the room not using FreeBSD

- Description of FreeBSD-specific concepts
- Stop me if something is unclear!





Outline

In the kernel

A bit of history

Drivers maintenance

In the Ports tree

What is the Ports tree?

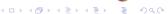
Video drivers in FreeBSD releases

The WITH_NEW_XORG mess

With the community

Future challenges





A bit of history

The era before KMS

- Originally: DRM shared with Linux and others
- Maintained by Eric Anholt

Then, KMS became mandatory

- Newer Intel GPUs only supported by the kernel driver
- Radeon GPUs to follow
- FreeBSD didn't participate in the development





A bit of history

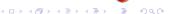
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2012: import of i915 KMS driver

- Copy of the old DRM code sys/dev/drm → sys/dev/drm2
- ▶ Import of i915 from Linux 3.2 (?)
- Only features required by i915 added to DRM device-independent code
- Linux APIs and data structures replaced by FreeBSD's ones
- Available in FreeBSD 9.1





2013: import of Radeon KMS driver

- Import of TTM and Radeon from Linux 3.8
- Some additions to DRM device-independent code
- Linux APIs and data structures replaced by FreeBSD's ones
- Available in FreeBSD 9.3





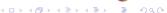


Drivers maintenance

Gratuitous changes all over the place

- Usage of FreeBSD APIs and data structures
- Incomplete implementation of DRM
- Some variables renamed
- ⇒ Very hard to import new code from Linux





Drivers maintenance

Resuming work

What's ready

- Update to i915 close to completion
- Sync DRM device-independent code with Linux 3.8 ready

In the longer term

- Plan to use a Linux API wrapper to ease the work Caveat: need to convince people
- Get rid of the code duplication (drm vs. drm2 directories)





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Drivers maintenance

In the Ports tree

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What is the Ports tree?

The Ports tree

What is the Ports tree?

- Packaging of 3rd-party applications
- ▶ Repository of Makefiles and patches
- Equivalent of debian directories or .spec files

How to install a port

cd /usr/ports/x11-servers/xorg-server make all install clean

(higher-level tools are available)





What is the Ports tree?

- Packaging of 3rd-party applications
- Repository of Makefiles and patches
- ► Equivalent of debian directories or .spec files

How to install a port

cd /usr/ports/x11-servers/xorg-server
make all install clean

(higher-level tools are available)





- Unique tree for all supported releases of FreeBSD
- Pro: All releases have access to recent applications
- Con: A package needs to handle missing features in older releases





- ► Historically: distribution of the Ports tree
- For a year: transition to binary packages as 1st class citizen
- Require many changes in the Ports tree and in habits
- Missing features
 For us, a Provides-like mechanism





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FreeBSD	Release	EOL	Drivers
8.4	Jun 2014	Jun 2015	(none)
9.1	Dec 2012	Dec 2014	i915
9.2	Sep 2013	Dec 2014	i915
9.3	Jul 2014	Dec 2016	i915, Radeon
10.0	Jan 2014	Jan 2015	i915, Radeon
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The graphics stack in the Ports tree

ErooPCD	Accentor	Intel DDX	ATI DDV	Maga
LIGEDOD	xserver	IIIILEI DDX	AIIDUX	wesa
8.4	1.7	2.7	6.14	7.6
9.1	1.12	2.21	6.14	9.1
9.2	1.12	2.21	6.14	9.1
9.3	1.12	2.21	7.x	9.1
10.0	1.12	2.21	7.x	9.1
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Remember

- One tree to support all releases
- ▶ No Provides-like feature
- ⇒ "Solution" (as in ugly workaround): WITH_NEW_XORG





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WITH_NEW_XORG: how it works

- Build-time flag in the Ports tree
- Select between two sets:

WITHOUT_NEW_XORG	WITH_NEW_XORG
xserver 1.7	xserver 1.12
xf86-video-intel 2.7	xf86-video-intal 2.21
xf86-video-ati 6.x	xf86-video-ati 7.x
Mesa 7.6	Mesa 9.1





WITH_NEW_XORG: how it works doesn't work

- Build-time: unsuitable for a binary packages repository
- Bind two unrelated applications: xserver and Mesa
- Nightmare to maintain
- Very confusing for end users
- Only solution until Provides feature is implemented
- ⇒ A fiasco for both developers and end users





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WITH_NEW_XORG: about to be removed!

- Way too expensive to maintain
- Cripple progress on today's software/hardware
- Cairo 1.12 + xf86-video-intel 2.7 already crash X
- Took a long time to convince people...





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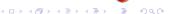
Small

- Two developers in the kernel
- Two developers in the ports
- Not all fully dedicated to the graphics stack

Still learning

- Lack of X11 expertise and understanding of hardware
- Low confidence in what we do sometimes





Users are afraid of changes

- ▶ Big rocky jumps instead of small incremental changes Example: xserver 1.7/Mesa 7.6 → xserver 1.12/Mesa 9.1
- We don't teach our users Example: Why are video drivers moved to the kernel?
- Many FreeBSD developers use Mac OS X
- ⇒ Gives a bad impression





- Little effort to talk and work with you
- Only consuming, almost no contribution





Talking about what we do

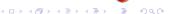
Existing tools

- A wiki section dedicated to the graphics stack
- Quarterly status reports
- Increased presence on mailing-lists and IRC

Explore more methods

- Improve bug reports handling
- Increase publications, maybe on a blog?
- Teach users





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- Finish to sync DRM and drivers with Linux 3.8
- Sync with later Linux release (3.10?)
- Implement dmabuf/PRIME
- Import Nouveau as time permits





- Continue the work on an alternative to udev
- Finish packaging of libgbm and Clover





Work on an alternative to systemd-logind?





- ► Help with the evdev GSoC
- Finish packaging of Wayland
- Port libinput
- Port Weston





- Contribute code
- Talk with you
- Come back to XDC







Our wiki section.

Roadmap, projects' status and contact information.

https://wiki.freebsd.org/Graphics





Summary

- ▶ Get rid of the legacy graphics stack in the Ports tree
- Ease the work in the kernel
- Improve our communication skills
- Work with you



