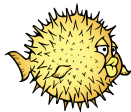# The future of X.Org on non-GNU/Linux systems

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OpenBSD/X.Org

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Introduction

- X has always been multi-platform
- XFree86 was started on SVr4 and FreeBSD, ported on Linux later.
- GNU/Linux/Freedesktop is now dominating the market... Most of X.Org development happen on Linux
- But In the Free Software world, should it be the only one ?

Agenda

History

- X11R5 : one DDX per system, used OS-Specific kernel interfaces
  also supported non TCP/IP network protocols (decnet,...)
- XFree86 2 & 3: one DDX for all systems
  with os-support layer, direct hw access to VGA cards,
  avoiding complex kernel interfaces for video card support
- XFree86 4: added the OS-independant modules loader
- X.Org 7 started removing support for older, non POSIX, non TCP-IP systems (VMS, DECnet, OS/2,..)
- Remove direct hw access (KMS, DRI2)
- Turn the DDX to a GNU/Linux ?

Modern X.Org architecture
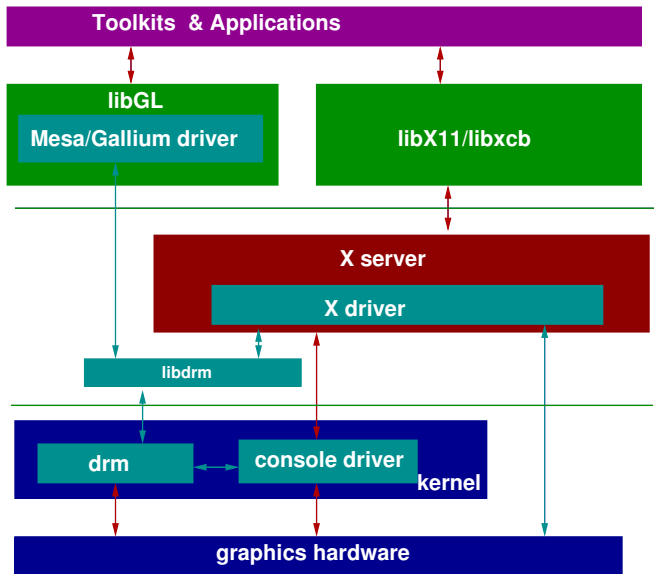
System dependencies locations

- `toolchain support`
  - C99
  - Threads (and TLS)
  - SSE2/Arm NEON/sparc VIS/PPC Altivec supprt (pixman)
- `xserver/hw/xfree86/common/compiler.h` ← nightmare...
- `xserver/hw/xfree86/os-support/` console driver interface
- `xserver/confg/` device hot-plug interface
- `libpciaccess` PCI bus interface
- `xf86-input-*` system keyboard/mouse interface
- `libdrm` kernel interface, including KMS
- `XQuartz Xwin 2` remaining system specific DDXen
- `xf86-video-*` video driver interfaces

Solaris

Thanks to Alan Coopersmith for the data Latest release: Solaris 11.1

X is in the OS.

KMS support for Intel i915,

- Xserver 1.12.2
- Mesa 7.10.2
- xf86-video-intel-2.18.0
- nvidia binary blob
- Sparc

future plans Solaris 12 :

- xserver 1.13 or 1.14 + associated drivers
- rumors of work on ati KMS support
- nvidia still supports Solaris

Illumos/OpenIndiana

Latest release OpenIndiana build 151a7
Xserver 1.7.7
Solaris i915 KMS driver is not available in Solaris public repository
Slow-progressing volunteer based work
`https://github.com/raichoo/illumos-gate/tree/kms`

FreeBSD

Latest Release: 9.1
X is in the ports tree.
xserver 1.10.6 (WITH_NEW_XORG) or 1.7.7 (default)
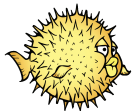Mesa 7.6.1
intel i915 GEM + KMS (xf86-video-intel 2.17.0)
Development founded by the FreeBSD Foundation.
`http://svnweb.freebsd.org/base/head/sys/dev/drm2/`
`https://wiki.freebsd.org/Intel_GPU`
No public plans for TTM + ati KMS driver.

OpenBSD

Latest release: 5.2

X is part of the OS. (Xenocara)

Xserver 1.12 + assorted drivers Mesa 7.11.2

Ported support for Iron Lake & Sandy Bridge chipsets to UMS in intel driver 2.12 in OpenBSD 5.2

Ivy Bridge in OpenBSD-current (5.3 to be released May 1st)

on-going work on Intel KMS

OpenBSD 5.3, stick to xserver 1.12. Issues with XAA removal in some drivers, Will jump to 1.14 for next release

No multitouch input support yet.

NetBSD

Latest release: NetBSD 6.0.1

Two X flavors:

- base system Xserver 1.10.3 + patches, Mesa 7.8.2
- pkgsrc 2012Q4 Xserver 1.6.5, Mesa 7.4.4
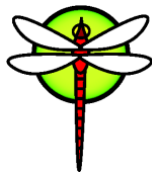
Port of OpenBSD's GEM implementation :

`https://github.com/gsutre/netbsd-drmgem/tree/master/src/sys/dev/pci/drm`

Not merged yet afaict.

KMS Plans :

`http://wiki.netbsd.org/projects/project/kms-gem/`

Supports lots of legacy and embedded drivers.

DragonFlyBSD

Latest release: 3.2
X from pkgsrc (Xserver 1.6.5)
Kernel side : 2012 Google Summer of Code project :
`http://www.dragonflybsd.org/docs/developer/GEMdrmKMS/`

Summary

Non-Linux system are lagging behind...
Main blocking points :

- Newer X server require newer drivers
- newer drivers require newer drm (kernel support)
- Kernel drivers are harder to port

Input :
Multitouch support is missing too.
Again : mostly a kernel issue...

Issues

- TTM - why is is so hard ?
  - Lack of documentation ...
- kernel's internals differences
- OpenGL ES - probably lots of tentacles in console driver
- Rewrites...
- Breakage in older drivers (un-maintained)...
- dependencies/packaging issues (LLVM for gallium Pixel shaders, for example)

License on kernel components...

ast: MIT
i810: MIT
i915: MIT (except intel_pm.c)
mga: MIT
nouveau: MIT (mostly)
r128: MIT
radeon: MIT
savage: MIT
sis: MIT
tdfx: MIT
ttm: MIT
via: MIT
vmwgfx: MIT

cirrus: GPL
exynos: GPL
gma500: GPL
mgag200: GPL
shmobile: GPL
udl: GPL
drm_edid_load.c: GPL
drm_fb_cma_helper.c: GPL
drm_gem_cma_helper.c: GPL

Wayland ?

- Weston is Linux only on purpose (performance)
- Weston depends on OpenGL ES + evdev + ?
- with KMS, it should be possible to write a Wayland compositor working on BSD or Solaris
- input driver needs work, but the models are close.

Volunteers ? (but it's too early...)

Conclusion (?)

- Tough times for non-Linux systems
- But there is progress and little hope
- Help needed for major hurdles
  - more documentation
  - test changes on more architectures

Questions ?