FLAVORS v.s. DEFAULT VERSION

Preface

I understand the argument for choosing DEFAULT_VERSIONS over FLAVORizing 3rd-party ports.
DEFAULT_VERSIONS seems to be a perfect fit for the problem description and appears “cleaner” at first glance. I also contemplated using it when I began working on moving these ports into the GhostBSD tree, but the nuances of the dependency graph surrounding these ports, their general properties, and the nature of XLibre's fork make using DEFAULT_VERSIONS create a suboptimal experience for our end users.

I created these slides to go over this issue visually and to hopefully clear things up.

There may be minor inaccuracies in the graphs, and I have only drawn truncated versions of the dependency graphs for these ports, because they have a massive chain of external dependencies that are irrelevant to our discussion here.

The current state of things in main.

The core of XLibre ports (drivers + server) has been committed to the main branch, but no modifications have been made to 3rd-party ports to prevent them from conflicting with it.

So, for example, if you were to build and install the xlibre-server on a device and also wanted to use the SCFB video driver with it, you would encounter a conflict that prevents the SCFB driver from installing unless you first remove the xlibre-server. This is caused by the fundamental conflict between xlibre-server and xorg-server, and SCFB, being dependent on xorg-server, naturally inherits this conflict.

This is also the case for the eGalax touch input driver and other 3rd-party X server drivers.

The 'kde' meta-port also conflicts with xlibre-server. This is caused by a dependency on some of the X.Org input drivers in plasma6-plasma-desktop.

The SLiM desktop manager also conflicts with xlibre-server because of its direct dependency on xorg-server.

X Land

3rd party ports

Libre Land

slim

xorg-server

xorg-drivers

xorg

xorg-minimal

The driver meta-port of each X server is used as a stand-in for all of its drivers; including them all would have overcrowded this diagram.

3rd party server drivers

- xf86-video-scfb
- xf86-input-egalax
- xorgxrdp
- xorgxrdp-devel

nvidia-driver

Slave ports:
-304
-340
-390
-470
-devel

plasma6-plasma-desktop

plasma6-plasma

kde

xlibre-server

xlibre-drivers

xlibre

xlibre-minimal

I have not drawn out every possible conflict between these ports; That would create a spiderweb mess of this diagram!
Only the important points of conflict have been drawn out; other ones can be derived from them.

This port is not yet committed. I discuss why this is the case in the next slides.

Unlike X.Org, XLibre is NOT a complete fork of its predecessor.
XLibre (as of now) has only forked the server and drivers categories, so it is still dependent on the other X.Org components.

Other X.Org categories

- xorg-apps
- xorg-docs
- xorg-libraries
- xcursor-themes
- xorg-fonts

Guide:

- X.Org meta-port
- XLibre meta-port
- XLibre X server
- X.Org X server
- 3rd party ports
- A depends on B
- A conflicts with B

How do FLAVORS solve this?

By bifurcating the ports in the "3rd party ports" section of our diagram into two FLAVORS, we can make them depend on XLibre components rather than the X.Org ones in their secondary FLAVOR, and leave the primary FLAVOR to behave as before.

The XLibre FLAVOR will also have a prefix of 'xlibre-' added to it.

This is a small and straightforward modification. Here is the patch for xf86-video-scfb as an example:

```
@@ -7,7 +7,16 @@ MAINTAINER= x11@FreeBSD.org
 COMMENT= X.Org syscons display driver
 WWW=  https://github.com/rayddteam/xf86-video-scfb

+FLAVORS= xorg xlibre
+FLAVOR?= ${FLAVORS:[1]}
+
+.if ${FLAVOR} == xlibre
+PKGNAMEPREFIX= xlibre-
+USES=  xlibre-cat:driver
+.else
 USES=  xorg-cat:driver
+.endif
+
 PLIST_FILES= lib/xorg/modules/drivers/scfb_drv.so \
   share/man/man4/scfb.4x.gz
```

X Land

3rd party ports

Libre Land

@xorg slim @xlibre

xlibre-server

xorg-server

xorg-drivers

xlibre-drivers

xorg

@xorg 3rd party server drivers @xlibre

@xorg xf86-video-scfb @xlibre

@xorg xf86-input-egalax @xlibre

@xorg xorgxrdp @xlibre

@xorg xorgxrdp-devel @xlibre

@xorg nvidia-driver @xlibre

Slave ports:
-304
-340
-390
-470
-devel

xorg-minimal

xlibre

xlibre-minimal

Other X.Org categories

xorg-apps

xorg-docs

xorg-libraries

xcursor-themes

xorg-fonts

@xorg plasma6-plasma-desktop @xlibre

@xorg plasma6-plasma @xlibre

@xorg kde @xlibre

Guide:

X.Org FLAVOR @xlibre

XLibre FLAVOR @xorg

X.Org meta-port

XLibre meta-port

XLibre X server

X.Org X server

3rd party ports

A depends on B A B

A conflicts with B A B

Further explanation for the FLAVORS solution:

As shown in the diagram, the conflicts with the 3rd-party ports are fully resolved. (The expected conflicts between the X servers and their set of drivers still remain.)
In this method, two packages are generated for each FLAVORized port, creating a simple dependency chain that, most importantly, does not require users to recompile any of the ports in the “3rd party ports” section if they choose to switch their dispaly server.

If a user chooses to switch to XLibre, they can just replace the 'xorg' FLAVOR of their packages with the 'xlibre' FLAVOR by typing a 'xlibre-' prefix before the package name when using pkg.
This is how it would look:

```
pkg install xlibre-kde xlibre-slim xlibre-xf86-input-egalax xlibre-minimal
```

This method was agreed upon in the GhostBSD ports and has been fully functional in their tree since August.
It is also worth noting that the number of ports requiring this modification is very small, as evident in the illustration.

(As a bonus, the naming scheme of X server drivers is homogeneous xlibre-xf86- for XLibre drivers, and xf86- for X.Org drivers)

Now a diagram for a DEFAULT_VERSION implementation:

X Land

3rd party ports

Libre Land

slim

xorg-server

xorg-drivers

xorg

xorg-minimal

3rd party server drivers

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xf86-input-egalax

xorgxrdp

xorgxrdp-devel

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xorg-libraries

xcursor-themes

xorg-fonts

plasma6-plasma-desktop

plasma6-plasma

kde

Guide:

X.Org meta-port

XLibre meta-port

XLibre X server

X.Org X server

3rd party ports

A depends on B

A conflicts with B

Looks familiar ... .

That's because it's the same diagram we saw at the beginning, and that is the reason why I did not choose to go with DEFAULT_VERSIONS.

DEFAULT_VERSIONS selects a specific "version" of a port's dependency at build time, which is set in make.conf. This means that, unlike with FLAVORS, only a single configuration of the package is generated for the conflicting ports, and that configuration would have its DEFAULT_VERSION of the X server set to X.Org if compiled in the FreeBSD pkg builds. So all this means that users will be faced with a set of conflicting ports in the binary repositories that will refuse to install along with some very popular ports like 'kde' and some essential drivers like nvidia-driver or xf86-video-scfb, similar to their current state in main.

To be able to install these ports with xlibre-server, a user would have to set up their ports tree, set the DEFAULT_VERSION of xserver to xlibre-server in their make.conf and start a build for these ports.

This is the crux of the problem: This method requires users to go through so many unnecessary hoops just to install their display server of choice.

In the next slide is what the dependency graph of the resulting packages from a hypothetical build would look like, were xlibre-server was set as the default dependency:

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xlibre-server

xorg-server

xorg-drivers

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xorg-fonts

plasma6-plasma-desktop

plasma6-plasma

kde

Guide:

X.Org meta-port

XLibre meta-port

XLibre X server

X.Org X server

3rd party ports

A depends on B

A conflicts with B

Further explanation.

This is essentially the inverse of the last diagram; the ports now would work with xlibre-server, but they would conflict with "X.Org Land's top half".

Even if we were to accept the hoops that a normal user would need to get through to install these ports, we are still faced with another issue: Meta-ports.

The xlibre-minimal meta-port depends on the SCFB video driver, which would not be installable with xlibre-server (which xlibre-minimal also depends on) if we were to build the ports with the DEFAULT_VERSION of the X server being set to xorg-server. This is why it has not yet been committed to the tree. To solve this, we would need to remove this meta-port and either modify xorg-minimal or create a new meta-port like xserver-minimal that would then need to depend on the chosen X server during build. All of these possible solutions are more destructive and invasive on the X.Org side.

Another great pro of using FLAVORS is that the different variants of the packages are prefixed accordingly. XLibre variants get the same ‘xlibre-’ prefix as other XLibre ports, and the X.Org variants would continue to use their old names as if nothing had changed; However, with DEFAULT_VERSION, each port generates a package with the same exact name in both cases.

Clarification for this effort's goal.

I want to clarify what my are, and are not, my indentations for creating these ports:

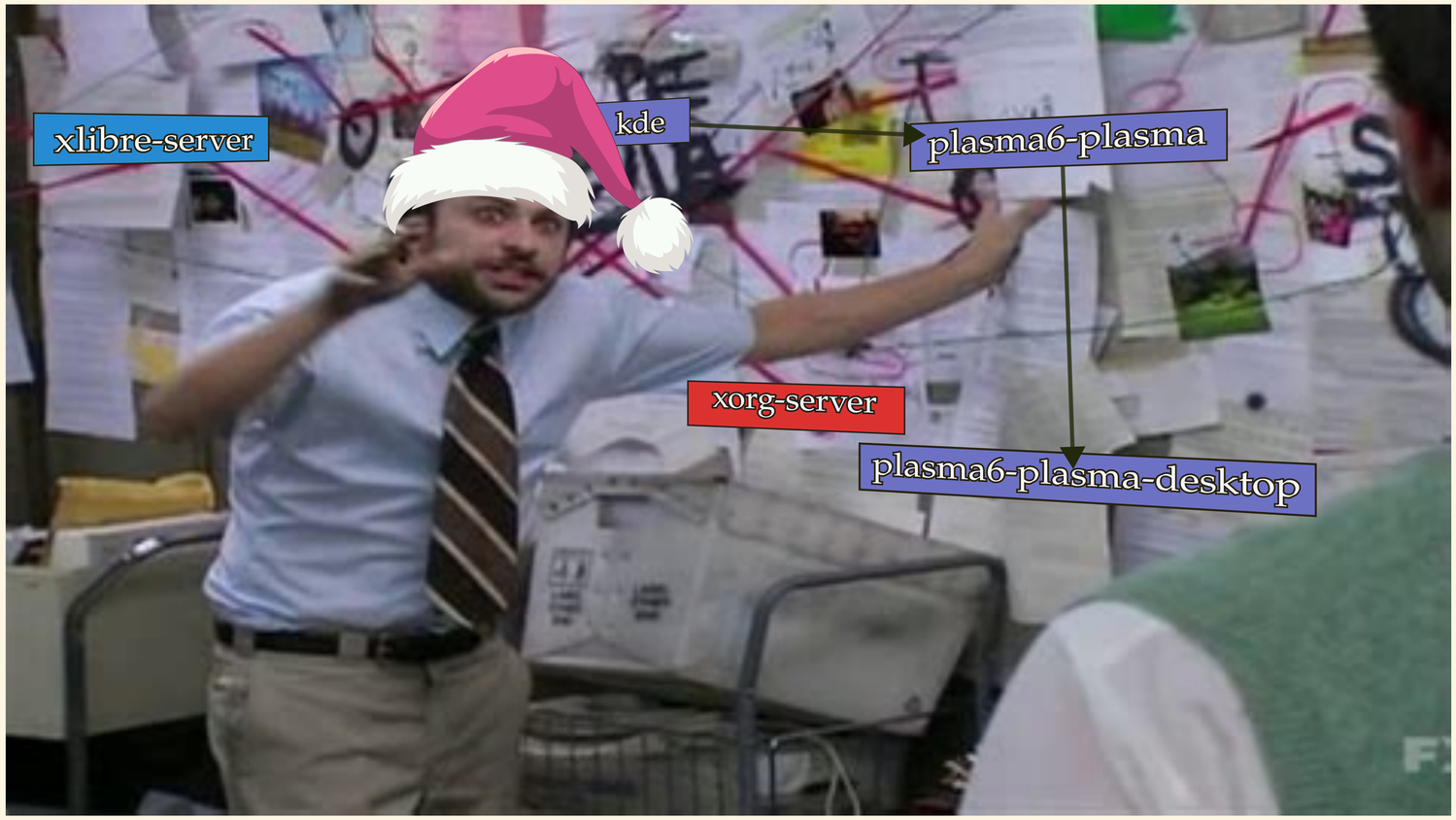
- I do not want to replace X.Org in the ports tree or set XLibre as "the default" in any way. I understand that X.Org is still the de facto X server that many people rely on.
- I do want to provide users with the ability to install and run XLibre, if they choose to do so.
- I do want it to be a reasonably simple experience to switch to XLibre.
- I want to see X11 alive and well. I believe it is a great protocol and a technology with huge potential and room for improvement.

I also believe that XLibre can better support FreeBSD than X.Org ever has, and it would be a good investment to have a display server that treats FreeBSD as a "first-class" OS.

Updates:

The patch for the ‘x11/nvidia-driver’ port has been accepted! I noticed it only near the end of this document's creation, and I think it is better to keep things unchanged for demonstrative purposes.

Thanks for reading!



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