

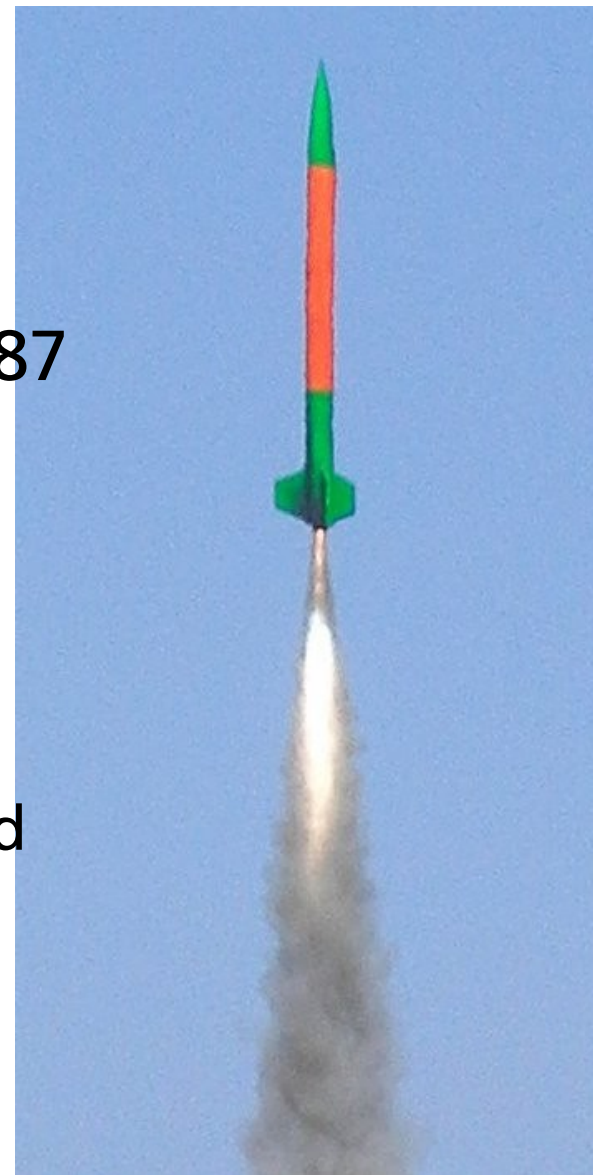
Sustaining X Development

Keith Packard
Distinguished Technologist
HP



Who am I

- Senior engineer at HP
- Free software developer since 1987
 - GDB, GCC, X, Linux, ...
- Rocketry Enthusiast
- X developer since 1987
 - Worked at MIT on X 1988-2002
 - Member of X.org Foundation board
 - Director of Freedesktop.org
- Debian developer since 2004
 - Member of Technical Committee



What is X

- A Window System
 - Multiplexes applications on one screen
 - De-multiplexes user actions to applications
- A Free Software project
 - Uses the MIT license (similar to BSD)
- A community
 - Developers
 - Corporations
 - Users



The early history of X



The MIT X Consortium

- Hosted in MIT's Laboratory for Computer Science
- Staff dedicated to X development
- Industry consortium



Early X11

The screenshot shows an early X11 desktop environment. The desktop is cluttered with windows including xconsole, xbiff, xman, oclock, xlogo, and a Manual Page window. The Manual Page window displays the man page for xset(1). The xlogo window shows a large 'X' with a black and white diagonal pattern. The oclock window shows a simple analog clock face. The xconsole window shows a terminal with a list of system boot logs.

Manual Page
Options Sections The current manual page is: xset(1).

XSET(1) XSET(1)

NAME
xset - user preference utility for X

SYNOPSIS
xset [-display *display*] [-b] [b on/off] [b *volume* [*pitch* [*duration*]]] [[-]bc] [-c] [c on/off] [c *volume*] [[+]-dpms] [dpms *standby* [*suspend* [*off*]]] [dpms *force* *standby*/suspend/off/on] [[-+]fp[-+] *path*,*path*[...]]] [fp default] [fp *rehash*] [[-]led [*integer*]] [led on/off] [m[ouse] [*accel mult*/*accel div*] [*threshold*]]] [m[ouse] default] [p *pixel color*] [[-]r [*keycode*]] [r on/off] [r *rate* *delay* [*rate*]] [s [*length* [*period*]]] [s *blank*/noblank] [s *expose*/noexpose] [s on/off] [s default] [s *activate*] [s *reset*] [q]

DESCRIPTION
This program is used to set various user preference options of the display.

OPTIONS
-display *display*
This option specifies the server to use; see *X(7)*.

b The **b** option controls bell volume, pitch and duration. This option accepts up to three numerical parameters, a preceding dash(-), or a 'on/off' flag. If no parameters are given, or the 'on' flag is used, the system defaults will be used. If the dash or 'off' are given, the bell will be turned off. If only one numerical parameter is given, the bell volume will be set to that value, as a percentage of its maximum. Likewise, the second numerical parameter specifies the bell pitch, in hertz, and the third numerical parameter specifies the duration in milliseconds. Note that not all hardware can vary the bell characteristics. The X server will set the characteristics of the bell as closely as it can to the user's specifications.

bc The **bc** option controls *bug compatibility* mode in the server, if

Terminal Output:
Dec 5 23:55 octave-bug-2.1.72
Dec 5 23:55 octave-bug -> octave-bug-2.1.72
Dec 5 23:55 octave-2.1.72
Dec 5 23:55 octave -> octave-2.1.72
Dec 5 23:55 mkoctfile-2.1.72
Dec 5 23:55 mkoctfile -> mkoctfile-2.1.72
Dec 5 23:55 ncgen
Dec 5 23:55 ncdump
Dec 5 23:55 blas-config
Dec 9 12:31 oneko
Dec 9 13:56 neko -> oneko
Dec 13 21:54 unrar
Jan 29 20:23 xdaliclock
Feb 15 23:08 xsetroot
Feb 15 23:11 oclock
Feb 15 23:11 xconsole
Feb 15 23:19 xcalc
Feb 15 23:19 xbiff
Feb 15 23:20 xset
Feb 15 23:20 xman
Feb 15 23:20 xeyes
Feb 15 23:20 .
creenshot



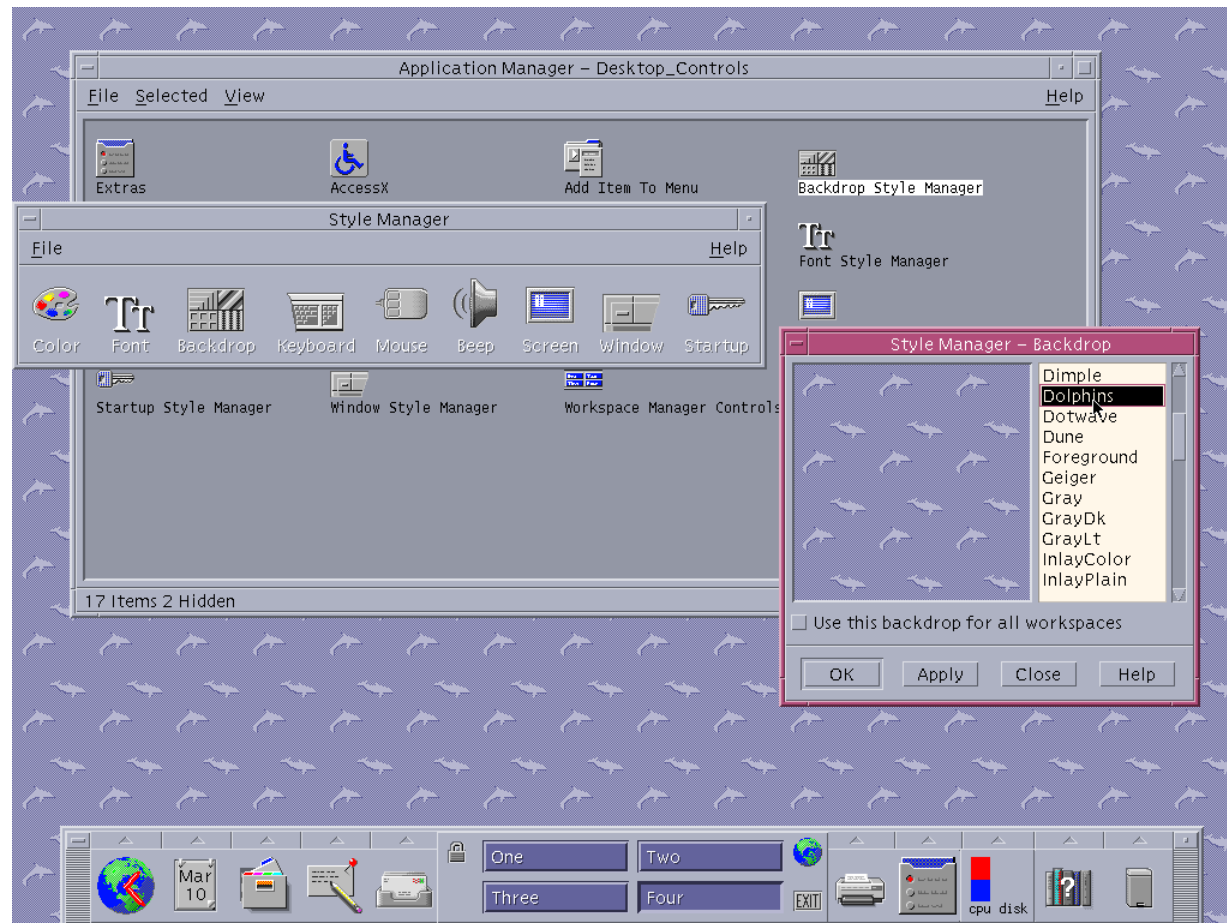
Unix Workstations



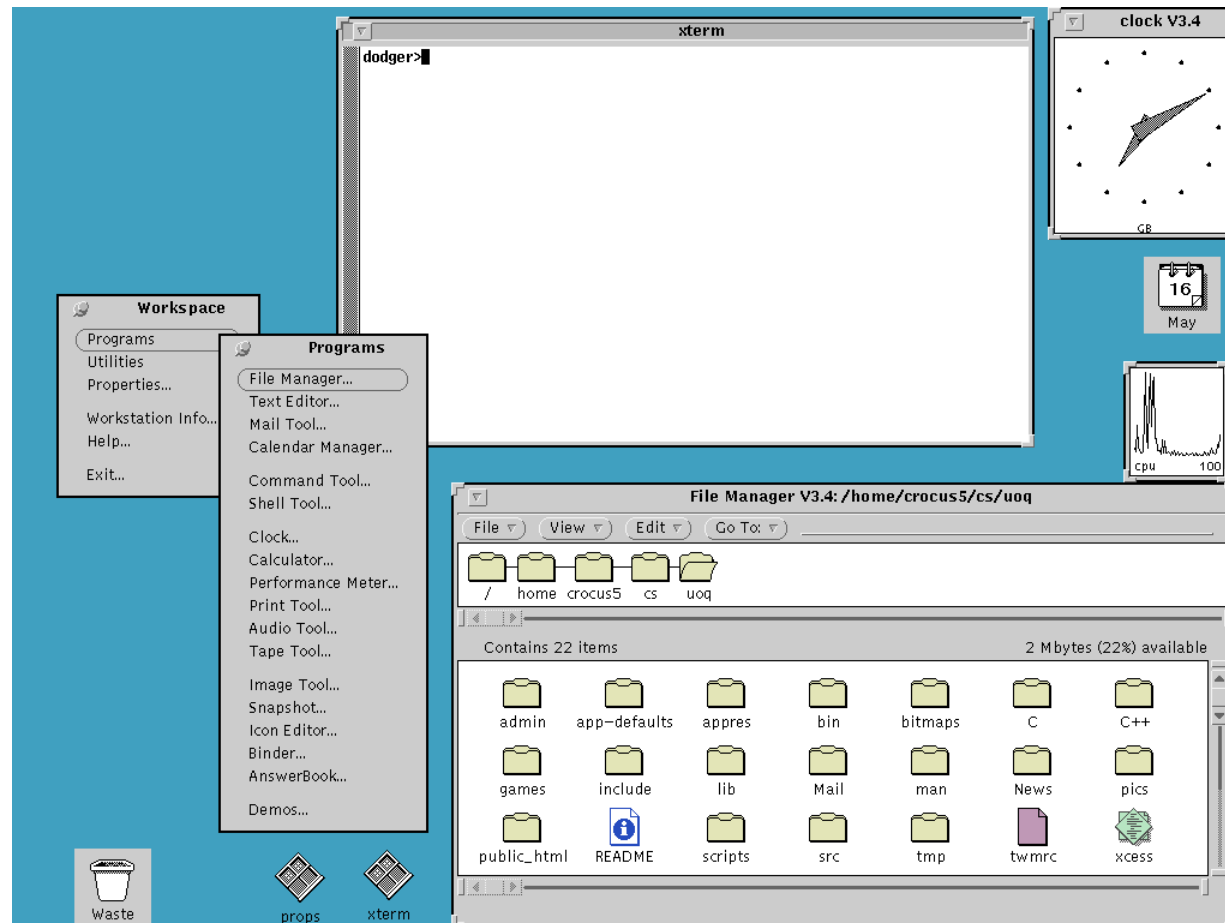
X Terminals



The Unix Wars



The Unix Wars

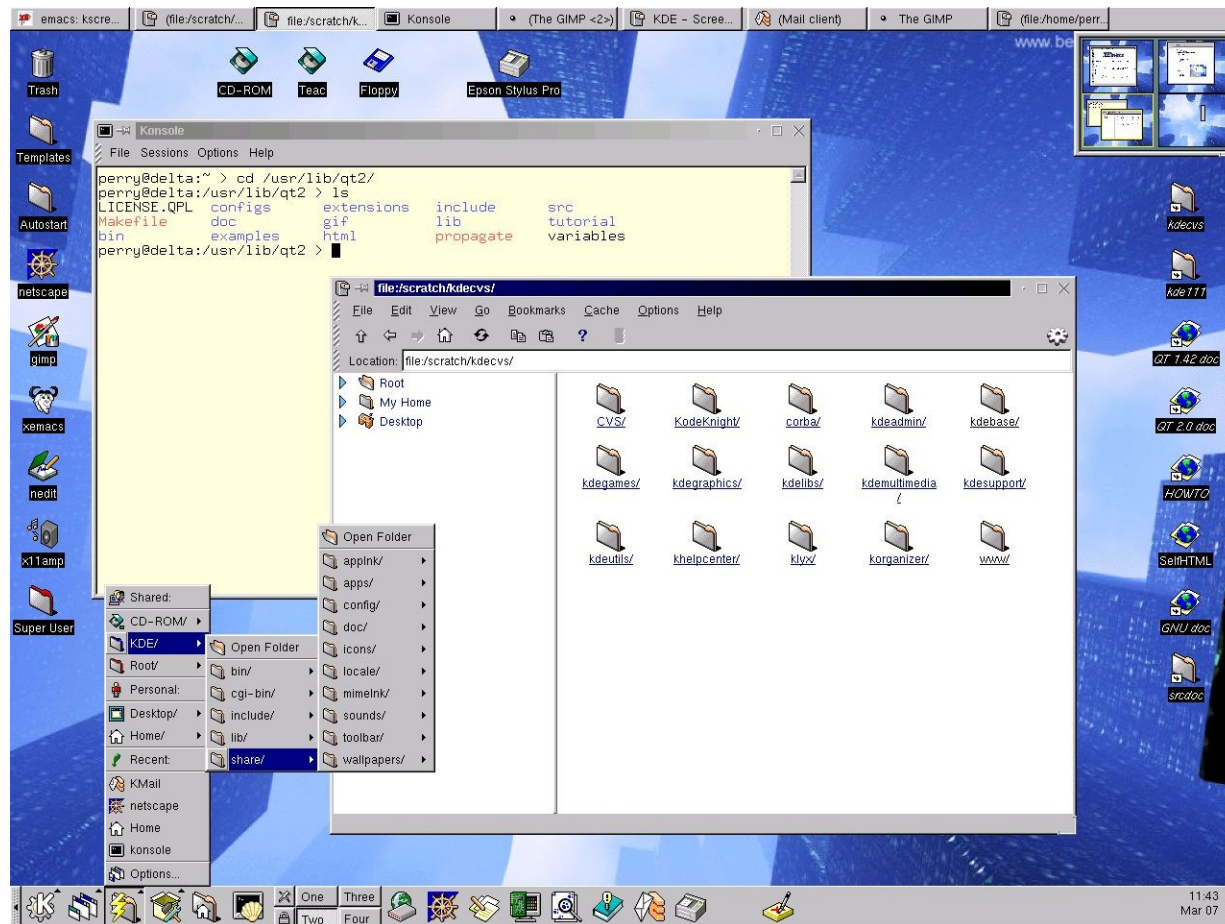


XFree86

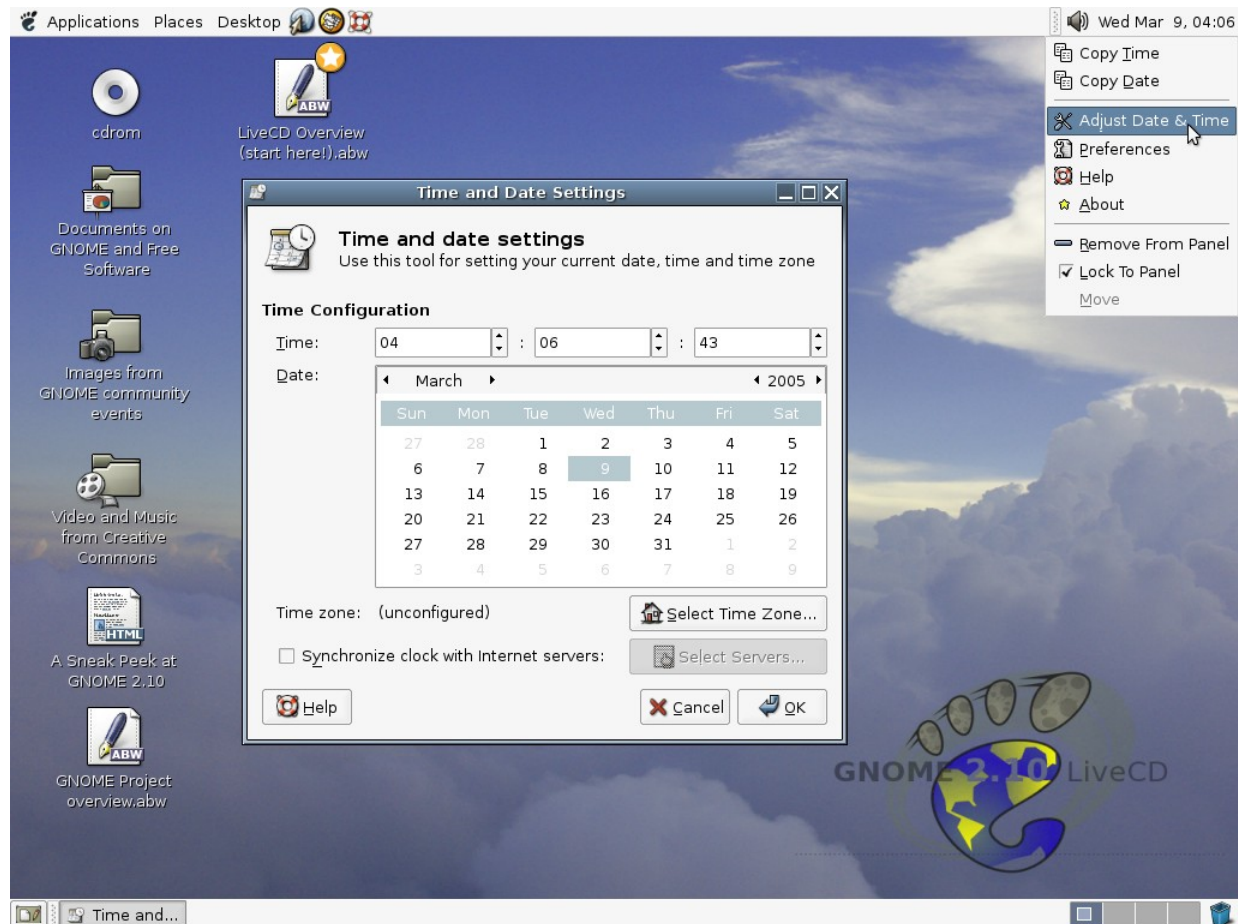
- The rebel alliance
- Free software X for various x86-based POSIX systems
- Locked out of the X Consortium process



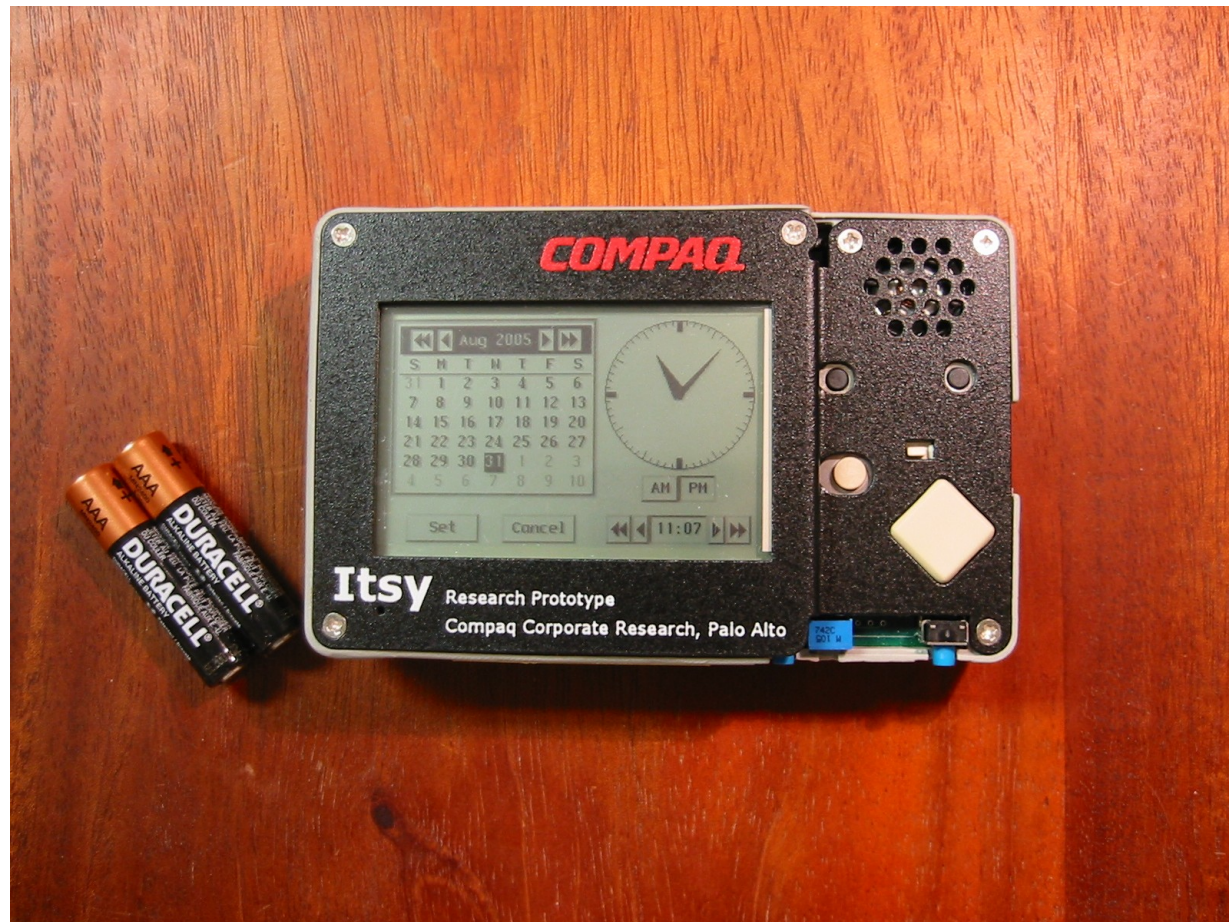
KDE



Gnome



Smaller Systems



Bigger Systems



Bigger Systems

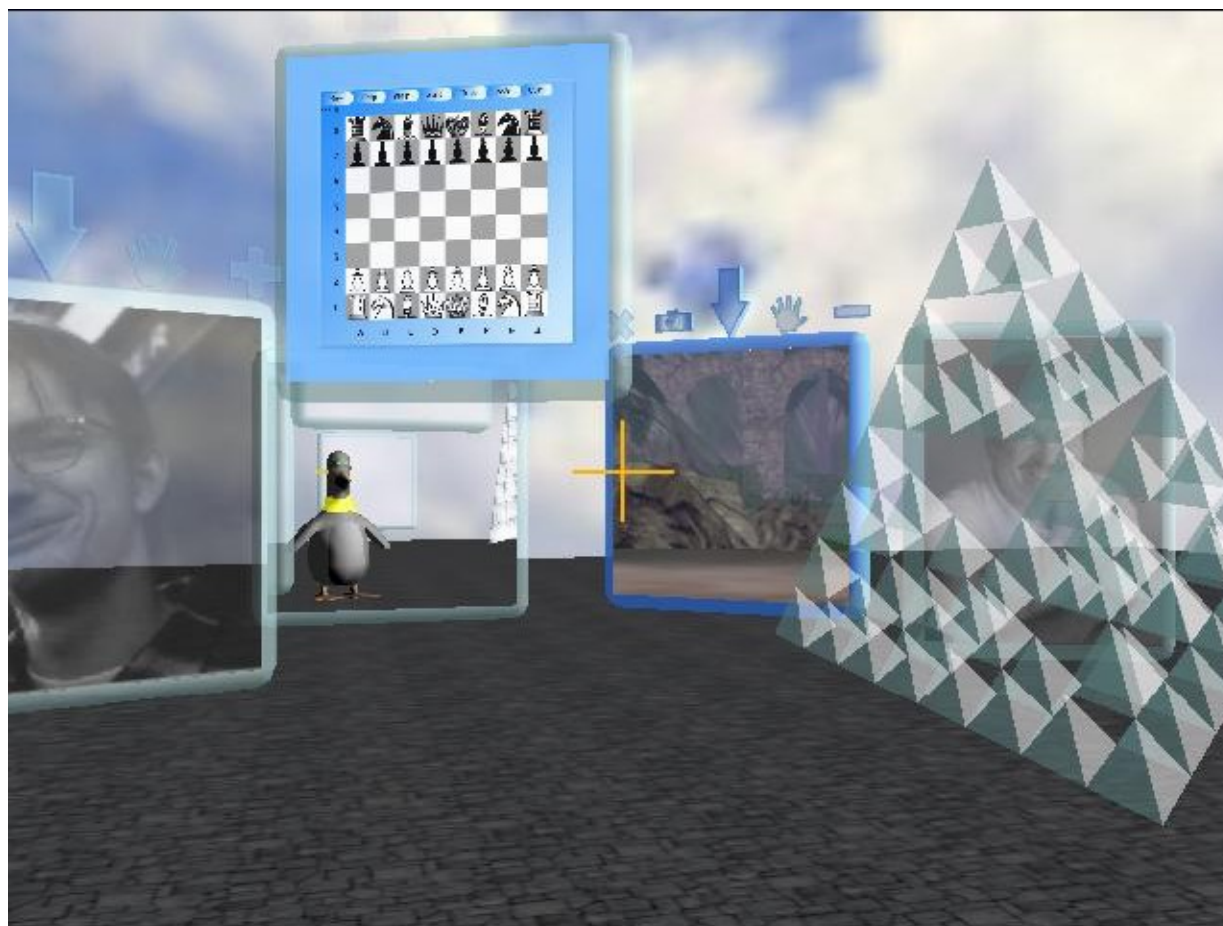


The X.org Foundation

- Community governance of X
-



New Experiments



Rewriting X

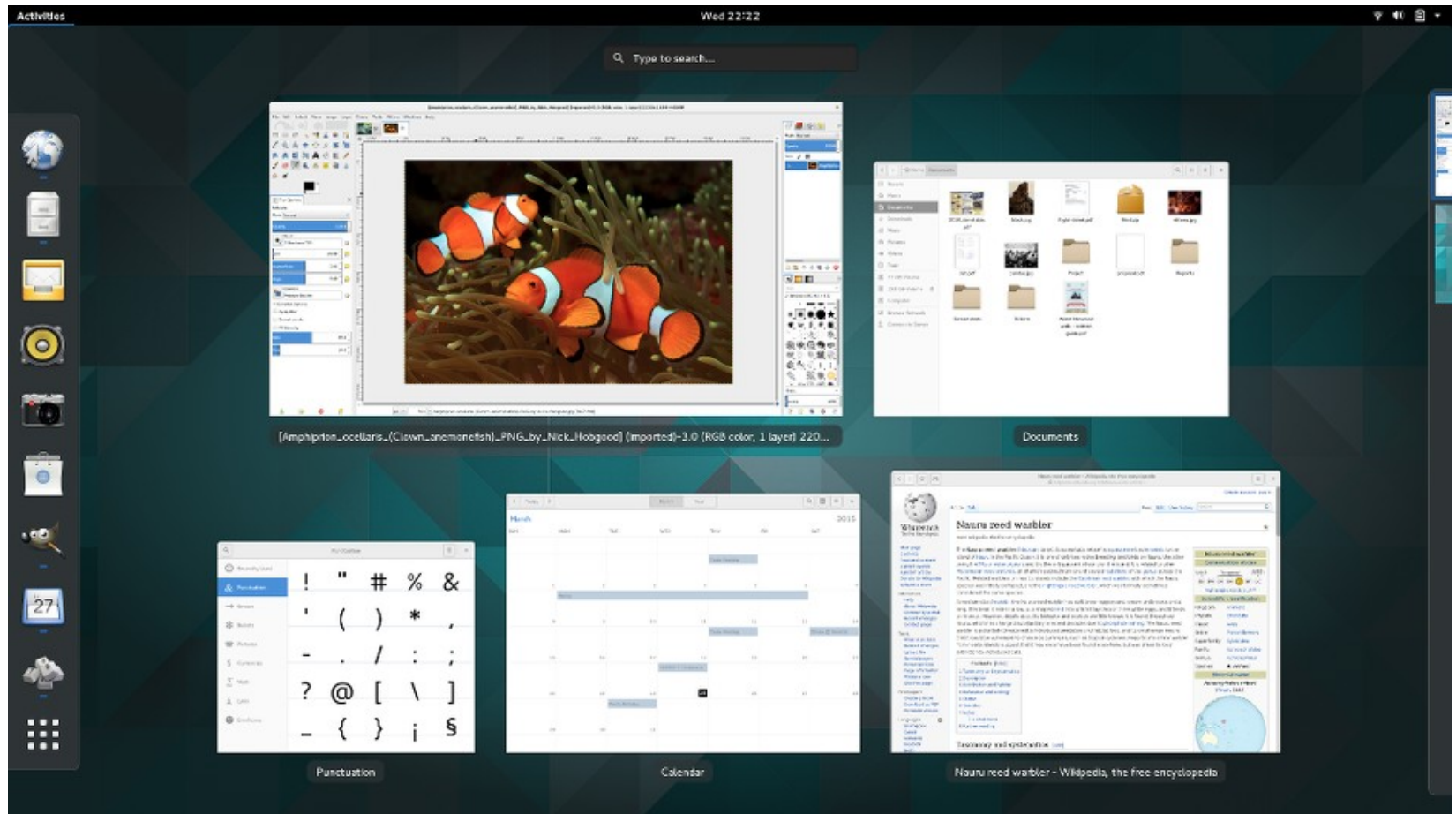
- Render Extension
- Composite extension
- X Input version 2
- X Resize and Rotate



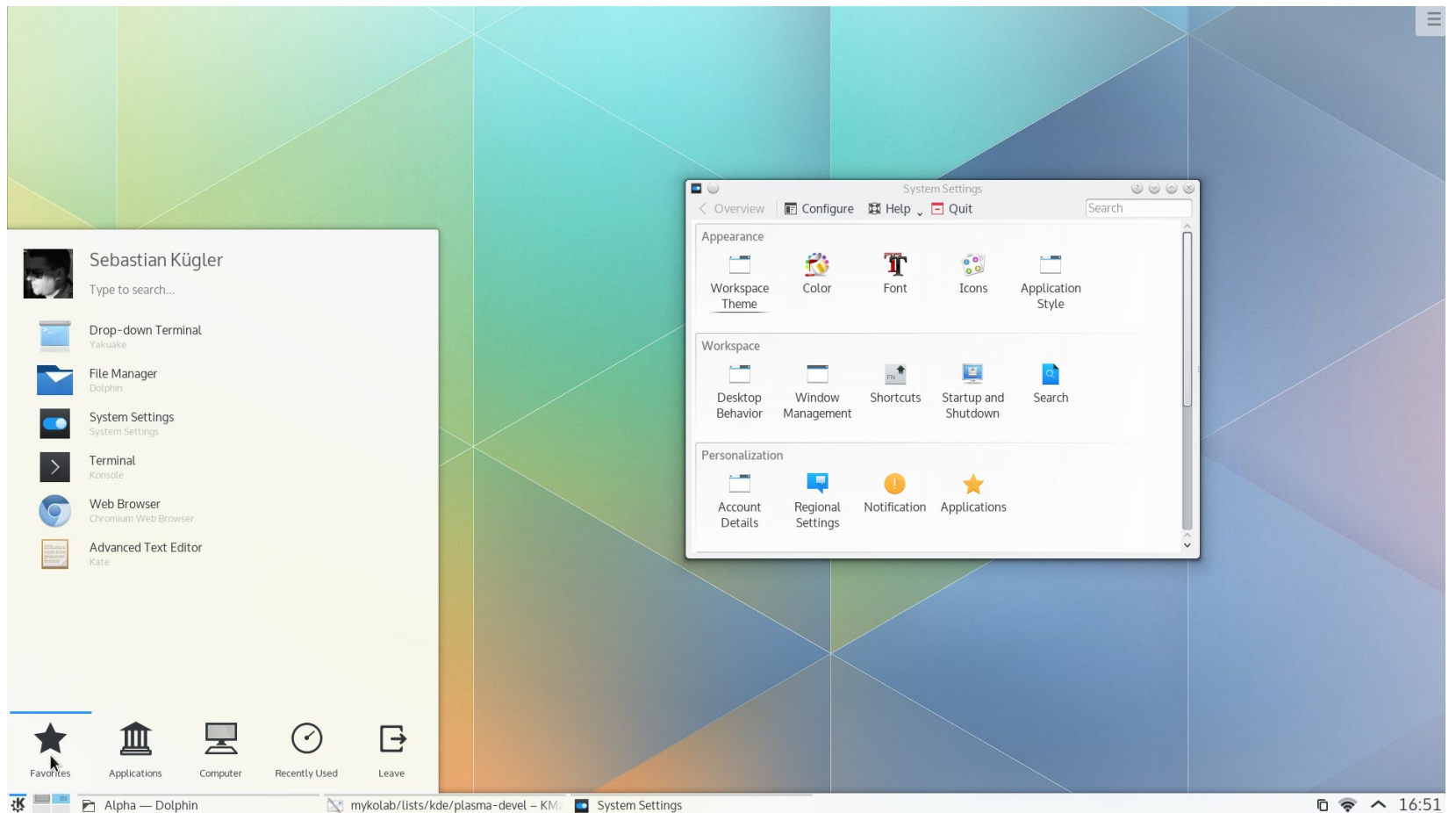
New Experiments



New Gnome



New KDE



Reimplementing X

- New kernel code
 - Kernel mode setting
 - Graphics execution manager
- Hardware-independent X driver
 - Glamor for drawing (based on OpenGL/GLES)
 - Modesetting for display config (based on KMS)



Lessons (mostly) learned

- GPL licenses are better than BSD licenses
- Network-based collaboration works
- Build the simplest possible system
- Make it extensible

