Release Notes for XFree86® 4.5.0

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Abstract

This document contains information about the various features and their current status in the XFree86 4.5.0 release.

1. Introduction to the 4.x Release Series

XFree86 4.0 was the first official release of the XFree86 4 series. The current release (4.5.0) is the latest in that series. The XFree86 4.x series represents a significant redesign of the XFree86 X server, with a strong focus on modularity and configurability.

2. Configuration: a Quick Synopsis

Automatic configuration was introduced with XFree86 4.4.0 which makes it possible to start XFree86 without first creating a configuration file. This was further improved in XFree86 4.5.0.

While the initial automatic configuration support was originally targeted ust for Linux and the FreeBSD variants, in 4.5.0 it now includes Solaris, NetBSD and OpenBSD support, and it is planned that automatic configuration will be supported on other platforms in future releases.

If you are running either Linux, FreeBSD, NetBSD, OpenBSD, or Solaris, try Auto Configuration by running:

```
XFree86 -autoconfig
```

If you want to customise some things afterwards, you can cut and paste the automatically generated configuration from the `/var/log/XFree86.0.log` file into an `XF86Config` file and make your customisations there. If you need to customise some parts of the configuration while leaving others to be automatically detected, you can combine a partial static configuration with the automatically detected one by running:

```
XFree86 -appendauto
```

If you using a platform that is not currently supported, then you must try one of the older methods for getting started like `xf86cfg`", which is our graphical configuration tool. It also has a text mode interface that an be used to create an initial configuration file and customise existing configurations.

After that, you can use XFree86 server's ability to create a starting configuration file. To do so you must login as root, and run:

```
XFree86 -configure
```

and then follow the instructions.

Finally, if all else fails, the trusty old standby text-based tool "`xf86config`" can also be used for generating X server config files.

Hopefully, at least one, and perhaps all of these various configuration options will give you a reasonable starting point for a suitable configuration file but we think that with the automatic mechanism you will probably not need any.

If you would like to customise the configuration file, see the XF86Config manual page. You should also check the driver-specific manual pages and the related documentation, which is found at *tables below* (section 4., page 12).

Before downloading any of the binary distributions for this release, read through the Installation Document as it can point out which particular binary you should download.

The next section describes what is **new** in the latest version (4.5.0) compared with the previous full release (4.4.0). There are many new features in this release and we unfortunately do not have enough space to cover them all here.

3. Summary of new features in 4.5.0.

This is a sampling of the new features in XFree86 4.5.0. A more complete list of changes can be found in the CHANGELOG that is part of the XFree86 source tree. It can also be viewed online at our CVSweb server `<URL:http://cvsweb.xfree86.org/cvsweb/xc/programs/Xserver/hw/xfree86/CHANGELOG?rev=HEAD>`.

3.1 Security Updates

The following security issues have been fixed in this release:

- xdm would listen on a random socket when the `DisplayManager.requestPort` resource was set to `0` (CAN-2004-0419 `<URL:http://cve.mitre.org/cgi-bin/cvename.cgi?name=CAN-2004-0419>`).
- Integer overflow in libICE/libSM.
- libXpm stack and integer overflow and other issues (CAN-2004-0687 `<URL:http://cve.mitre.org/cgi-bin/cvename.cgi?name=CAN-2004-0687>`, CAN-2004-0688 `<URL:http://cve.mitre.org/cgi-bin/cvename.cgi?name=CAN-2004-0688>`, CAN-2004-0914 `<URL:http://cve.mitre.org/cgi-bin/cvename.cgi?name=CAN-2004-0914>`, CAN-2005-0605 `<URL:http://cve.mitre.org/cgi-bin/cvename.cgi?name=CAN-2005-0605>`).
- Potential security issues related to wrap-around of memory allocation requests in font handling and other areas.

3.2 Video Driver Enhancements

3.2.1 General

- In most drivers, fix a long-standing off-by-one error in the programming of sync pulse start and end for video modes based on VGA or its extensions.

3.2.2 ati

- Fix various bugs in the Mach64-based panel support.
- Re-instate atimisc's support for DGA on UltraSPARC platforms.

3.2.3 chips

- Fix the stretching option and centering.

3.2.4 cirrus

- Add support for the NEC PC-9821 with CLGD755x.

3.2.5 i810

- Add support for memory size tweaking in the BIOS for 845G.
- Fix Xv flickering on the 830GM and later.
- Add support for the 915G/915GM chipsets.
- Add dual-head and clone support for the 915G, 855GM, 830GM chipsets.
- Add ARGB cursor support for all chipsets. This requires an updated agpgart kernel driver.
- Add module lid status checking.
- Fix XVideo when high resolutions are used on local flat panels.
- Add PanelID identification.
- Detect monitor changes on VT switch (830GM and up).
- Support custom video modes in the video BIOS, when available.
- Fix some Xv bugs.
- Set the default monitor parameters to match the display size for the 830GM and up when they are not available from another source, improving the default video mode selection in these cases.

3.2.6 mga

- Make the Mystique lockup workaround more selective, avoiding different problems on cards that do not require the workaround.
- Fix segfaults that occur when the XaaNoSolidFillRect and/or XaaNoMono8x8PatternFillRect options are used.
- Fix for Xv resolution loss problem.
- Add i2c and Maven support, providing DDC and DPMS support for the second head on dual-head cards.

3.2.7 nv

- PCI-Xpress support added.
- Add support for newer hardware.
- Workaround for Toshiba M30 laptop issue.
- Reject modes larger than the flat panel.
- DPMS support for DVI added.
- Cursor update for NV11 so that alpha blended cursors will work in conjunction with dithering (laptop panels).

3.2.8 r128

- Improve the handling of timeouts in R128CCEWaitForIdle()

3.2.9 radeon

- The DAC is turned off for DPMS modes, fixing a problem that can badly affect some monitors.
- Add an option for avoid flickering and blank screen problems with iBooks.

3.2.10 rendition

- Fix bad free() calls in the probe function.

3.2.11 s3

- Add support for interlaced video modes.
- Remove cfb support.
- Correct the depth checking (32 is not a supported depth).
- Fix DAC probing.
- Add IBM RGB525 support.
- Fix a ScreenToScreenCopy bug that shows up with xtest.

3.2.12 s3virge

- Fix a bug that shows up when mode restoration results in a switch between colour and mono operation.

3.2.13 savage

- Fix HW cursor state on VT switching.
- Disable the RANDR extension when using rotation.
- Turn off the back light on panels when DPMS "off" mode is activated.
- Allow black as an Xv colour key.

3.2.14 sis

- Fix some modes for 1400x1050 and 1600x1200 panels.
- BIOS data layout-related fixes for 661/741/760.
- Xv fixes.
- Fix LCD support for ECS A90x and ECS A907.
- Add video blitter as a second Xv adaptor for the M650/651 and later.
- Add (display?) hot plug support.
- Add preliminary support for the SiS340.
- Fix bad external symbols in this driver module.

3.2.15 sunffb

- Fix a segfault when acceleration is disabled.

3.2.16 vesa

- Do not attempt to set the palette format for depths greater than 8. This fixes a problem on some platforms.
- Fix a substantial memory leak on server regeneration.
- Fix screen blanking for non-VGA compatible modes.
- Blank the screen at startup, so that the contents of the previous session are not initially visible.

3.2.17 via

- Restructuring and acceleration cleanups.
- Fix some DRM-related problems.
- Cleanup the DDC/EDID retrieval.

3.2.18 vmware

- Various register state save/restore fixes.
- Fix host-cursor mode.
- Allow any reasonable depth if 8BIT_EMULATION is set, supporting non-host depths.
- Set the "monitor" parameters to allow the default resolution to be a little smaller than the host resolution rather than simply 640x480.

3.3 Input Driver Enhancements

3.3.1 keyboard

- A bug in the application of the Linux `KDKBDREP` ioctl has been fixed, preventing unnecessary use of a fallback that directly programs the keyboard hardware and produces warning message with recent Linux kernels.
- Differentiate between Alt+Ctrl+SPECIAL and Alt+Ctrl+Shift+SPECIAL key sequences.
- Avoid various keycode conversions on NEC PC-98 platforms.
- Fix off-by-one problem for keys on FreeBSD/sparc64.

3.3.2 mouse

- Add a serial PNP entry for the Genius NetScroll+ mouse.
- Fix a problem with the wsmouse driver losing events on 64-bit architectures.
- Add/improve protocol and device auto-detection for FreeBSD, Linux, NetBSD, OpenBSD, and SunOS/Solaris, eliminating the need to provide any of this information in the config file in the majority of situations.
- Increase the maximum number of buttons supported from 12 to 24.
- Fix a multiple-free bug, that could lead to a crash.

3.3.3 elographics

- Fix problems where the driver gets out of sync under heavy loads.
- Add an `"AllowNoCntl"` option, which allows the driver to be used with some other protocols, like the SmartSet 2500s, which share the same default protocol.

- Fix a problem with the cursor not correctly following the touch in a dual-head configuration. This fix has also been applied to other relevant input drivers.

3.3.4 eloinput

- A new driver for ELO Graphics 2500U USB touch screens.

3.3.5 fpit

- Add support for the passive pen of the Stylistic 2400.
- Fix some driver bugs.

3.4 XKB updates

- Update the Hindi/Devanagari map.
- Add Sorbian map.
- Add German Dvorak map.
- Fix wrong brokenbar keysym in the de_CH map.
- Rename the microsoftprose keyboard model to microsoftprousb because it is not Swedish-specific but a common USB variant.
- Add nodeadkeys variant to the gb map.
- Replace the comma keysym on the KPDL key in the Brazilian map with KP_Separator.
- Add multi-layout compatible Hungarian, Azerbaijani, Canadian, Mongolian, and Vietnamese maps.
- Update Serbian map with new variant.
- Add Genius KB-12e model to the inet map.
- Update ABNT2 geometry (including two variants) and change the Brazilian map to avoid ABNT2 specific keycodes section.
- Add Classical Latin map.
- Replace the Latvian map with a new one.
- Fix some errors in the Dzongka/Tibetan map.
- Add ur_PK (Urdu) map.
- Fixes for the Bengali map.
- Add Sinhala (Sri Lanka) map.
- Add missing keycode to the "xfree86" keycodes files.
- Update the mapping for the Microsoft Natural Multimedia keyboard.
- Fixes for the Croatian map.
- Add a Polish variant to the French keyboard layout.
- Add a standard Kyrgyz map.

3.5 X Server and Extension Updates

- Mesa as used in the XFree86 `"GLcore"` module for indirect GLX rendering has been updated to version 6.2.1.

- Fixed bugs in the Screen Saver extension that could cause an X server crash.
- Fixed a bug in the X-Resource extension that could cause an X server crash when the client host and server host have different endianness.
- Added support to the Xvfb server for specifying the screen origins when Xinerama is enabled.
- Ensure that the Xvfb's root window depth and visuals are set correctly.
- Work around bug in Mac OS X 10.1's AppKit that causes rootless XDarwin to lock up when creating windows
- Fix XDarwin's launch of X clients by double clicking in the Finder when there is a space in the path.
- Allow XDarwin to interpret scroll wheel mouse events correctly when the shift key is held down.
- Add initial XInput support for XDarwin.
- Add an option for XDarwin to always use Mac command key equivalents.
- Make XDarwin not default to StaticColor on ix86.
- Fix a bug that caused restacks to be optimized away in rootless mode.
- Add support for dynamic screen configuration changes in rootless XDarwin.
- Fix a problem with multiple glyphs in the RENDER extension's RenderAddGlyphs that caused malloc corruption.
- Fix a segfault when XAA's overlay acceleration is invoked with the XaaNoSolidFillRect option.
- Fix the disabling of individual DPMS states.
- Rework the XFree86 server's SBUS code so that SBUS adapters are properly detected on SunOS.
- Auto-detect DPMS support based on EDID data.
- Fix DPMS enable/disable logic.
- Allow multiple probe phases when using automatic configuration, which allows the driver search to continue after failures at the PreInit stage.
- Update the static XFree86 driver list to allow automatic configuration to work with statically linked XFree86 servers.
- Add a '-autoconfig' command line option to the XFree86 server to enable automatic configuration even when a configuration file is present.
- Integrate the TinyX servers into the standard XFree86 build.
- Fix a problem where a big request length of zero does not generate a BadLength error.
- Add a Distributed Multihead X server (DMX) and related extension.
- Fix a segfault in the cfb module.
- Fixes for the MIT-SHM extension's Xineramafication.
- Fix detection of phantom PCI devices.
- Fix x86emu's handling of the 0xe8 and 0xe9 opcodes.

- Modify x86emu's handling of SHLD/SHRD instructions to allow shifts greater than 15 for 16-bit operands. This undocumented behaviour is expected by the BIOS in an SM722 controller.
- Avoid some references to unloaded data in the XFree86 server, which can cause crashes in some situations.
- Change the DDC/EDID root window property data from signed to unsigned.
- Fix the XFree86-Misc extension's PassMessage function.
- Fix XFree86-DGA for multi-domain architectures.
- Extend the XF86Config format and parser/config to allow multiple Monitor sections to be referenced from a Screen section.
- Allow multiple XFree86 configuration sources to be combined, and add a -appendauto" command line option to allow automatic configuration data to be appended to a partial static configuration.
- Extend the XF86Config format and parser/config to allow multiple ServerFlags, Files, and Module sections in a config file.
- Use a more complete set of the probed EDID data in determining the default monitor parameters.
- Add a "preferred" video mode type, which can be obtained from the probed EDID information, or from the static configuration. This allows the native video mode to be used by default for digital panels.
- Add tentative support for newer iterations of HP's zx1 chipsets.
- Fix xf86fbman's largest linear area offscreen computation.
- Print the XFree86 server's command line in the log file.
- Update getconfig to work with older versions of Perl, and to detect when the version of Perl is too old and when Perl is not available.
- Extend automatic configuration and getconfig to work with SBUS video devices in SPARC platforms.
- Update the ValidMode functions in most video drivers to return more specific status values when a mode is rejected.

3.6 Client and Library Updates

3.6.1 Xlib and related libraries

- Fix an Xlib segfault that may occur when IPv6 XDM-AUTHORIZATION-1 data is present in the .Xauthority file.
- Add WrapHelp.c and enable XdmAuth by default.
- Fix a null dereference in libSM when given a bad previous session ID.

3.6.2 Xterm

The changes to xterm since XFree86 4.4 are:

Improved behavior

- Change resource settings for color4 and color12, add some discussion in XTerm-col.ad.

- Modify the criteria for disowning primary selection. Previously, this happened anytime the cursor was moved before the end of the selection. That would ensure that any insert/delete of char or line, as well as scrolling, would disown the selection. The new criteria change this to checking if the operations would modify the data which is highlighted.
- Change default translations so a BtnDown which is not recognized is simply ignored rather than emitting a bell. That makes it less obtrusive when the user tries to use a mouse which provides more capabilities than the X mouse driver supports, e.g., one with a horizontal scroll wheel.
- Modify to allow turning UTF-8 mode via escape sequence even if -wc option was not given at startup.
- Add menu items and corresponding actions for switching on/off the UTF-8 mode and Xft (TrueType) support.
- Modify FreeType support to allow resizing the font, in the same ways the window can be resized if fixed fonts are used. The relative font sizes are derived from the fixed font sizes.
- Implement blinking text, using the timer for blinking cursor.
- Add translation to ASCII of commonly-used characters that groff translates to Unicode, when the font in use does not provide the corresponding glyphs.
- Modify constraints in form used to layout toolbar, to work with newer Xaw in XFree86 4.x.
- Make active-icon work properly when TrueType fonts are used, as well as when UTF-8 mode is used.
- Improve rendering for Xft, allow it to draw non-linedrawing characters such as "pi", which were drawn from internal tables with patch #180.
- Modify initialization of 256- and 88-colors so that colors beyond 16 are normally not X resources. This works around a hard-coded limit in Xt which breaks xterm when 256-colors and luit are both configured (report by Noah Friedman).
- Fix problem responding to session management events, e.g., which would make logging out very slow.

Modified behavior

- Enable utmpx support for NetBSD 1.6C and newer.
- Modify Help() to make "xterm -h" write to standard output rather than standard error.
- Improve error-reporting for root user by checking if $DISPLAY is set rather than using the useless message from X11 library.
- Improve $WINDOWID for configuration with toolbar by making it refer to the top-level shell rather than the parent of the current window. For that case, the parent is a form widget, which does not have a name, which made the $WINDOWID not very useful as a parameter for xwininfo.
- Improve pattern used in uxterm to check for UTF-8 locale, e.g., for HPUX.
- Modify uxterm script to use locale program to verify if the derived locale is installed.
- Add case to uxterm to accommodate locales ending with "@euro", e.g., fr_FR.UTF-8@euro.
- For Linux, if IUTF8 is defined, e.g., on recent 2.6.x kernels, set the corresponding flag for the slave pty, to enable UTF-8 interpretation of backspace in cooked mode.
- Modify faceSize resource to use a floating-point internal value.

- Modify XTerm.ad to set saveLines default to 1024.
- Change xterm version string to use __vendorversion__ where that is available, and "XTerm" otherwise. Rather than reporting the version of X that was current when xterm was modified, it reports the version against which it was built.

New resource settings

- Add scoFunctionKeys resource, to match manpage.
- Add -fd option and resource faceNameDoublesize to specify double-wide fonts with Xft.
- Add resource showMissingGlyphs to outline places on the screen where a font lacks the corresponding glyph.
- Add resource showBlinkAsBold to control whether blinking text should be shown as bold or actual blinking text.
- Add utmpDisplayId resource to allow users to control whether the display identifier (display number and screen number) are retained in the connection information recorded in utmp.
- Add bellOnReset resource to allow users to disable bell which sounds on hard reset since patch #183 changes to DECSCL.

New configure script options

- Add --disable-setuid option to configure script.
- Add --disable-full-tgetent option to configure script, allowing one to ignore a termcap library in favor of ncurses/curses.

Other new features

- Add mini-luit feature, which supports Latin9 directly rather than via luit, provided that Unicode fonts are used.
- Add dynamic abbreviation support like Emacs.
- Add "erase2" and "eol2" keywords to ttyModes resource, for recent/current FreeBSD.

Bug-fixes (see http://invisible-island.net/xterm/xterm.log.html for a more complete list):

- Modify initialization and cleanup of utmp data to also compare the ut_line member.
- Correct table entry for DEL in the ground state, which marked it as a printable character from patch #171.
- Correct change from patch #157 which uses getlogin() to check for an alias; the storage used for the related getpwuid() call was overwritten by the data used for comparison.
- Correct case of SCS for character set 0 (line-drawing) to allow it to be selected into GR.
- Modify creat_as() to only fork if xterm is actually running as setuid and/or setgid. This works around a Cygwin bug which hangs when logging is enabled and makes xterm a little faster for systems using interfaces such as utempter.
- Modify Cleanup() to avoid operations such as X calls that might use unsafe functions when it is called by a signal handler.
- Check for type of failure in xim_real_init() to avoid looping when the problem is an unsupported input method rather than a failure to connect to the XIM server. Problem was introduced in patch #175.
- Add missing #undef OPT_SESSION_MGT to xtermcfg.hin to make the configure script's --disable-session-mgt option work.

- Correct options parsing for -into option so it can be combined with -e.
- Make escape sequence reporting dynamic colors consistent with the logic that sets it; choosing the opposite color when reverse video is set.
- Fix a repainting bug introduced in patch #180: when using a font lacking line-drawing characters, a repaint of the screen could skip horizontally an extra amount after filling in the missing character.
- Modify terminfo to accommodate luit, which relies on G1 being used via an ISO-2022 escape sequence. Note that this relies in turn on bug fixes in ncurses after the 5.4 release.

3.6.3 Luit

- Fix a synchronization problem with luit's handling of tty settings.
- Extract information from the pty before forking rather than after, to avoid conflicting with the child process's modifications to the line.

3.6.4 GLX/DRI

- Mesa and its DRI drivers have been updated to version 6.2.1, plus some bug fixes.
- Add a 915G DRI driver.
- Fix a GLX multi-thread bug.

3.6.5 twm

- Add support for XPM icons.
- Add IconMaxWidth and TitleIndent configuration parameters.

3.6.6 xdm

- Improve the operation of IPv6-enabled xdm when the platforms's IPv6 support is disabled.
- Make use of Xlib's _XGetHostname rather than attempting to duplicate it.
- Fix sessreg for NetBSD.
- Update docs and config to handle authDir being in a non-default location.

3.6.7 xfs

- Fix log file opening with the '-user nobody' option.

3.7 I18n and Fonts

- FreeType has been updated to version 2.1.8.
- The FreeType-1.x based X-TrueType XFree86 server font backend has been retired. The functionality it provides is now available in the "FreeType" font backend. The old `"xtt"` module is now a wrapper that loads the `"freetype"` module.
- A bug that prevented the `VeraIt.ttf` font from being installed has been fixed.
- Fix a problem that could cause apps using the zh_CN.UTF-8 locale to crash.
- Fix freetype module segfault with some Type1 fonts.
- Replace unicode keysyms in the en_US.UTF-8 Compose file with "traditional" ones where such keysyms exist.
- Fix the ct_encoding sequence in the zh_CN.gbk locale.

- Update the 8859-7 unicode conversion data file to the current version.
- Update the gb3212.1980-0 encoding to handle fonts that do not have a unicode table.
- Add encoding files for cns11643-1, cns11643-2, cns11643-3, and suneu_greek.
- Add support for the si_LK.UTF-8 locale.
- Reinstate the original mkfontdir program, because its mkfontscale equivalent does not handle creating encodings.dir files as well as is necessary.
- Fix for fstobdf generating corrupted BDF files.
- Update locale info for Kinyarwanda, the language of Rwanda.
- Add nine missing South African locales.
- Add extra fontset records into XLC_LOCALE, fixing problems with text output by Xuft8 functions under non-Unicode locales.
- Add a Kyrgyz locale.

3.8 OS Support Updates

- Numerous fixes and enhancements for the Solaris/SPARC platform support, including the ability to build 64-bit shared libraries.
- Support added for OpenBSD/amd64.
- Differentiate left and right modifier keys on Mac OS X 10.3.
- Fix some path-related issues on OS/2 with xman and xf86cfg.
- Update the transport layer to allow LOCAL SCO connection types to be used for more than just X protocol connections.
- Cleanups for the SCO port.
- Fixes for FreeBSD/amd64 support.
- Add support for newer UltraSPARC variants to the SunOS/Solaris and Linux ports.
- Understand the PCI bus naming scheme found in Linux 2.6 kernels.

4. Drivers

4.1 Video Drivers

XFree86 4.5.0 includes the following video drivers:

Drivers marked with (*) are present in a preliminary form in this release, but are not complete and/or stable yet.

Drivers marked with (+) are for Linux/SPARC only.

Drivers marked with (-) are for Linux/mips only.

Darwin/Mac OS X uses IOKit drivers and does not use the module loader drivers listed above. Further information can be found in README.Darwin.

4.2 Input Drivers

XFree86 4.5.0 includes the following input drivers:

Drivers marked with (*) are available for Linux only.

Driver Name	Description	Further Information
`apm`	Alliance Pro Motion	README.apm
`ark`	Ark Logic	
`ati`	ATI	README.ati, README.r128, r128(4), radeon(4)
`chips`	Chips & Technologies	README.chips, chips(4)
`cirrus`	Cirrus Logic	
`cyrix` (*)	Cyrix MediaGX	README.cyrix
`fbdev`	Linux framebuffer device	fbdev(4)
`glide`	Glide2x (3Dfx)	glide(4)
`glint`	3Dlabs, TI	glint(4)
`i128`	Number Nine	README.I128, i128(4)
`i740`	Intel i740	README.i740
`i810`	Intel i8xx	README.i810, i810(4)
`imstt`	Integrated Micro Solns	
`mga`	Matrox	mga(4)
`neomagic`	NeoMagic	neomagic(4)
`newport` (-)	SGI Newport	README.newport, newport(4)
`nsc`	National Semiconductor	nsc(4)
`nv`	NVIDIA	nv(4)
`rendition`	Rendition	README.rendition, rendition(4)
`s3`	S3 (not ViRGE or Savage)	
`s3virge`	S3 ViRGE	README.s3virge, s3virge(4)
`savage`	S3 Savage	savage(4)
`siliconmotion`	Silicon Motion	siliconmotion(4)
`sis`	SiS	README.SiS, sis(4)
`sunbw2` (+)	Sun bw2	
`suncg14` (+)	Sun cg14	
`suncg3` (+)	Sun cg3	
`suncg6` (+)	Sun GX and Turbo GX	
`sunffb` (+)	Sun Creator/3D, Elite 3D	
`sunleo` (+)	Sun Leo (ZX)	
`suntcx` (+)	Sun TCX	
`tdfx`	3Dfx	tdfx(4)
`tga`	DEC TGA	README.DECtga
`trident`	Trident	trident(4)
`tseng`	Tseng Labs	
`via`	VIA	via(4)
`vesa`	VESA	vesa(4)
`vga`	Generic VGA	vga(4)
`vmware`	VMWare guest OS	vmware(4)

5. Known Problems

Currently no known problems are documented.

6. Overview of XFree86 4.x.

XFree86 4.x has a single X server binary called `XFree86`. This binary can either have one or more video and input drivers linked in statically, or more usually, dynamically, and in that manner load the video drivers, input drivers, and other modules that are needed.

XFree86 4.5.0 has X server support for most UNIX® and UNIX-like operating systems on Intel/x86 platforms, plus support for Linux and some BSD OSs on Alpha, PowerPC, IA-64,

Driver Name	Description	Further Information
aiptek(*)	Aiptek USB tablet	aiptek(4)
calcomp	Calcomp	
citron	Citron	citron(4)
digitaledge	DigitalEdge	
dmc	DMC	dmc(4)
dynapro	Dynapro	
elographics	EloGraphics	
eloinput	Elo 2500U USB	eloinput(4)
fpit	Fujitsu Stylistic Tablet PCs	fpit(4)
hyperpen	Aiptek HyperPen 6000	
js_x	JamStudio pentablet	js_x(4)
kbd	generic keyboards (alternate)	kbd(4)
keyboard	generic keyboards	keyboard(4)
microtouch	MicroTouch	
mouse	most mouse devices	mouse(4)
mutouch	MicroTouch	
palmax	Palmax PD1000/PD1100	palmax(4)
penmount	PenMount	
spaceorb	SpaceOrb	
summa	SummaGraphics	
tek4957	Tektronix 4957 tablet	tek4957(4)
ur98(*)	Union Reality UR-F98 headtracker	ur98(4)
void	dummy device	void(4)
wacom	Wacom tablets	wacom(4)

AMD64, SPARC, and Mips platforms, and for Darwin on PowerPC. Support for additional architectures and operating systems is in progress and is planned for future releases.

6.1 Loader and Modules

The XFree86 X server has a built-in run-time loader, which can load normal object files and libraries in most of the commonly used formats. The loader does not rely on an operating system's native dynamic loader support and it works on platforms that do not provide this feature. This allows for the modules to be operating system independent (although not, of course, CPU architecture independent) which means that a module compiled on Linux/x86 can be loaded by an X server running on Solaris/x86, or FreeBSD, or even OS/2.

The X server makes use of modules for video drivers, X server extensions, font rasterisers, input device drivers, framebuffer layers (like mfb, cfb, etc), and internal components used by some drivers (like XAA),

The module interfaces (both API and ABI) used in this release are subject to change without notice. While we will attempt to provide backward compatibility for the module interfaces as of the 4.0 release (meaning that 4.0 modules will work with future core X server binaries), we cannot guarantee this. Compatibility in the other direction is explicitly not guaranteed because new modules may rely on interfaces added in new releases.

Note about module security

> The XFree86 X server runs with root privileges, i.e. the X server loadable modules also run with these privileges. For this reason we recommend that all users be careful to only use loadable modules from reliable sources, otherwise the introduction of viruses and contaminated code can occur and wreak havoc on your system. We hope to have a mechanism for signing/verifying the modules that we provide available in a future release.

6.2 Configuration

The XFree86 server uses a configuration file as the primary mechanism for providing configuration and run-time parameters. The configuration file format is described in detail in the XF86Config(5) manual page.

The XFree86 server has support for automatically determining an initial configuration on most platforms, as well as support or generating a basic initial configuration file.

6.3 Command Line Options

Command line options can be used to override some default parameters and parameters provided in the configuration file. These command line options are described in the XFree86(1) manual page.

6.4 XAA

The XFree86 Acceleration Architecture (XAA) was completely rewritten from scratch for XFree86 4.x. Most drivers implement acceleration by making use of the XAA module.

6.5 Multi-head

Some multi-head configurations are supported in XFree86 4.x, primarily with multiple PCI/AGP cards.

One of the main problems is with drivers not sufficiently initialising cards that were not initialised at boot time. This has been improved somewhat with the INT10 support that is used by most drivers (which allows secondary card to be "soft-booted", but in some cases there are other issues that still need to be resolved. Some combinations can be made to work better by changing which card is the primary card (either by using a different PCI slot, or by changing the system BIOS's preference for the primary card).

6.6 Xinerama

Xinerama is an X server extension that allows multiple physical screens to behave as a single screen. With traditional multi-head in X11, windows cannot span or cross physical screens. Xinerama removes this limitation. Xinerama does, however, require that the physical screens all have the same root depth, so it isn't possible, for example, to use an 8-bit screen together with a 16-bit screen in Xinerama mode.

Xinerama is not enabled by default, and can be enabled with the `+xinerama` command line option for the X server.

Xinerama was included with X11R6.4. The version included in XFree86 4.x was completely rewritten for improved performance and correctness.

Known problems:

- Not all window managers are Xinerama-aware, and so some operations like window placement and resizing might not behave in an ideal way. This is an issue that needs to be dealt with in the individual window managers, and isn't specifically an XFree86 problem.

6.7 DGA version 2

DGA 2.0 is included in 4.5.0. Documentation for the client libraries can be found in the XDGA(3) man page. A good degree of backwards compatibility with version 1.0 is provided.

6.8 DDC

The VESA® Display Data Channel (DDC™) standard allows the monitor to tell the video card (or on some cases the computer directly) about itself; particularly the supported screen resolutions and refresh rates.

Partial or complete DDC support is available in most of the video drivers. DDC is enabled by default, but can be disabled with a "Device" section entry: `Option "NoDDC"`. We have support for DDC versions 1 and 2; these can be disabled independently with `Option "NoDDC1"` and `Option "NoDDC2"`.

At startup the server prints out DDC information from the display, and will use this information to set the default monitor parameters and video mode when none are provided explicitly in the configuration file.

6.8.1 Changed behavior caused by DDC.

Several drivers uses DDC information to set the screen size and pitch. This can be overridden by explicitly resetting it to the and non-DDC default value 75 with the `-dpi 75` command line option for the X server, or by specifying appropriate screen dimensions with the "DisplaySize" keyword in the "Monitor" section of the config file.

6.9 GLX and the Direct Rendering Infrastructure (DRI)

Direct rendered OpenGL® support is provided for several hardware platforms by the Direct Rendering Infrastructure (DRI), which is part of Mesa. Mesa also provides the 3D core rendering component of GLX. Further information can be found at the DRI Project's web site `<URL:http://dri.sf.net/>` and the Mesa web site `<URL:http://www.mesa3d.org>`.

6.10 XVideo Extension (Xv)

The XVideo extension is supported in XFree86 4.x. An XvQueryPortAttributes function has been added as well as support for XvImages. XvImages are XImages in alternate color spaces such as YUV and can be passed to the server through shared memory segments. This allows clients to display YUV data with high quality hardware scaling and filtering.

6.11 X Rendering Extension (Render)

The X Rendering extension provides a 2D rendering model that more closely matches application demands and hardware capabilities. It provides a rendering model derived from Plan 9 based on Porter/Duff image composition rather than binary raster operations.

Using simple compositing operators provided by most hardware, Render can draw anti-aliased text and geometric objects as well as perform translucent image overlays and other image operations not possible with the core X rendering system.

XFree86 4.5.0 provides a partial implementation of Render sufficient for drawing anti-aliased text and image composition. Still to be implemented are geometric primitives and affine transformation of images.

Unlike the core protocol, Render provides no font support for applications, rather it allows applications to upload glyphs for display on the screen. This allows the client greater control over text rendering and complete access to the available font information while still providing hardware acceleration. The Xft library provides font access for Render applications.

6.11.1 The Xft Library

On the client side, the Xft library provides access to fonts for applications using the FreeType library, version 2. FreeType currently supports Type1 and TrueType font files, a future release is expected to support BDF and PCF files as well, so Render applications will have access to the complete range of fonts available to core applications. One important thing to note is that Xft uses the vertical size of the monitor to compute accurate pixel sizes for provided point sizes; if your monitor doesn't provide accurate information via DDC, you may want to add that information to `XF86Config`.

To allow a graceful transition for applications moving from core text rendering to the Render extension, Xft can use either core fonts or FreeType and the Render extension for text. By default, Xft is configured to support both core fonts and FreeType fonts using the supplied version of FreeType 2. See the section on FreeType support in Xft for instructions on configuring XFree86 to use an existing FreeType installation.

The Xft library uses a configuration file, `XftConfig`, which contains information about which directories contain font files and also provides a sophisticated font aliasing mechanism. Documentation for that file is included in the Xft(3) man page.

6.11.2 FreeType support in Xft

XFree86 4.5.0 includes sources for FreeType version 2.1.8, and, by default, they are built and installed automatically.

6.11.3 Application Support For Anti-Aliased Text

Only three applications have been modified in XFree86 4.5.0 to work with the Render extension and the Xft and FreeType libraries to provide anti-aliased text. Xterm, xditview and x11perf. Migration of other applications may occur in future releases.

By default, xterm uses core fonts through the standard core API. It has a command line option and associated resource to direct it to use Xft instead:

- `-fa` family / `.VT100.faceName:` family. Selects the font family to use.

Xditview will use Xft instead of the core API by default. X11perf includes tests to measure the performance of text rendered in three ways, anti-aliased, anti-aliased with sub-pixel sampling and regular chunky text, but through the Render extension, a path which is currently somewhat slower than core text.

6.12 Other extensions

The XFree86-Misc extension has not been fully ported to the new server architecture yet. This might be completed in a future release.

The XFree86-VidModeExtension extension has been updated, and mostly ported to the new server architecture. The area of mode validation needs further work, and the extension should be used with care. This extension has support for changing the gamma setting at run-time, for modes where this is possible. The `xgamma` utility makes use of this feature. Compatibility with the 3.3.x version of the extension is provided. The missing parts of this extension and some new features should be completed in a future release.

6.13 xedit

Xedit has several new features, including:

- An embedded lisp interpreter that allows easier extension of the editor.
- Several new syntax highlight modes, and indentation rules for C and Lisp.
- Flexible search/replace interface that allows regex matches.
- Please refer to `xedit(1)` for more details.

6.14 Font support

Details about the font support in XFree86 4.x can be found in the README.fonts document.

6.15 TrueType support

The XFree86 4.x server comes with a TrueType backend, known as the "FreeType" backend, based on the FreeType library. The functionality of the former X-TrueType was merged into the FreeType backend by the After X-TT Project for the XFree86 4.4.0 release, and the old X-TrueType backend has been dropped as of XFree86 4.5.0.

6.16 CID font support

Support for CID-keyed fonts is included in XFree86 4.x. The CID-keyed font format was designed by Adobe Systems `<URL:http://www.adobe.com>` for fonts with large character sets. The CID-keyed font support in XFree86 was donated by SGI `<URL:http://www.sgi.com>`. See the LICENSE document for a copy of the CID Font Code Public License.

6.17 Internationalisation of the scalable font backends

XFree86 4.x has a ''fontenc'' layer to allow the scalable font backends to use a common method of font re-encoding. This re-encoding makes it possible to use fonts in encodings other than their their native encoding. This layer is used by the FreeType, Type1 and Speedo backends.

6.18 Large font optimisation

The glyph metrics array, which all the X clients using a particular font have access to, is placed in shared memory, so as to reduce redundant memory consumption. For non-local clients, the glyph metrics array is transmitted in a compressed format.

6.19 Unicode/ISO 10646 support

What is included in 4.x:

- All ''-misc-fixed-*'' BDF fonts are now available in the ISO10646-1 encoding and cover at least the 614 characters found in ISO 8859-{1-5,7-10,14,15}, CP1252, and MES-1. The non-bold fonts also cover all Windows Glyph List 4 (WGL4) characters, including those found in all 8-bit MS-DOS/Windows code pages. The 8-bit variants of the ''-misc-fixed-*'' BDF fonts (ISO8859-1, ISO8859-2, KOI8-R, etc.) have all been automatically generated from the new ISO10646-1 master fonts.
- Some ''-misc-fixed-*'' BDF ISO10646-1 fonts now cover a comprehensive Unicode repertoire of over 3000 characters including all Latin, Greek, Cyrillic, Armenian, Gregorian, Hebrew, IPA, and APL characters, plus numerous scientific, typographic, technical, and backwards-compatibility symbols. Some of these fonts also cover Arabic, Ethiopian, Thai, Han/Kanji, Hangul, full ISO 8859, and more. For the 6x13 font there is now a 12x13ja Kanji extension and for the 9x18 font there is a 18x18ja Kanji/Han/Hangul extension, which covers all ISO-2022-JP-2 (RFC 1554) characters. The 9x18 font can also be used to implement simple combining characters by accent overstriking. For more information, read Markus Kuhn's UTF-8 and Unicode FAQ `<URL:http://www.cl.cam.ac.uk/~mgk25/unicode.html>`.
- Mark Leisher's ClearlyU proportional font (similar to Computer Modern).
- ISO 10646/Unicode UTF-8 Level 1 support added to xterm (enabled with the `-u8` option).
- The FreeType font backend supports Unicode-encoded fonts.

6.20 Xlib Compose file support and extensions

A more flexible Compose file processing system was added to Xlib in XFree86 4.4.0. The compose file is searched for in the following order:

1. If the environment variable **$XCOMPOSEFILE** is set, its value is used as the name of the Compose file.
2. If the user's home directory has a file named "`.XCompose`", it is used as the Compose file.
3. The old method is used, and the compose file is "<*xlocaledir*>/<*localename*>`/Compose`".

Compose files can now use an "include" instruction. This allows local modifications to be made to existing compose files without including all of the content directly. For example, the system's iso8859-1 compose file can be included with a line like this:

```
include "/usr/X11R6/lib/X11/locale/iso8859-1/Compose"
```

There are two substitutions that can be made in the file name of the include instruction. **%H** expands to the user's home directory (the **$HOME** environment variable), and **%L** expands to the name of the locale specific Compose file (i.e., "**<***xlocaledir***>**/**<***localename***>**`/Compose`").

For example, you can include in your compose file the default Compose file by using:

```
include "%L"
```

and then rewrite only the few rules that you need to change. New compose rules can be added, and previous ones replaced.

Finally, it is no longer necessary to specify in the right part of a rule a locale encoded string in addition to the keysym name. If the string is omitted, Xlib figures it out from the keysym according to the current locale. I.e., if a rule looks like:

```
<dead_grave> <A> : "\300" Agrave
```

the result of the composition is always the letter with the "\300" code. But if the rule is:

```
<dead_grave> <A> : Agrave
```

the result depends on how Agrave is mapped in the current locale.

6.21 Luxi fonts from Bigelow and Holmes

XFree86 now includes the "Luxi" family of Type 1 fonts and TrueType fonts. This family consists of the fonts "Luxi Serif", "Luxi Sans" and "Luxi Mono" in Roman, oblique, bold and bold oblique variants. The TrueType version have glyphs covering the basic ASCII Unicode range, the Latin 1 range, as well as the *Extended Latin* range and some additional punctuation characters. In particular, these fonts include all the glyphs needed for ISO 8859 parts 1, 2, 3, 4, 9, 13 and 15, as well as all the glyphs in the Adobe Standard encoding and the Windows 3.1 character set.

The glyph coverage of the Type 1 versions is somewhat reduced, and only covers ISO 8859 parts 1, 2 and 15 as well as the Adobe Standard encoding.

The Luxi fonts are original designs by Kris Holmes and Charles Bigelow from Bigelow and Holmes Inc., who developed the Luxi typeface designs in Ikarus digital format. URW++ Design and Development GmbH converted the Ikarus format fonts to TrueType and Type 1 font programs and implemented the grid-fitting "hints" and kerning tables in the Luxi fonts.

The license terms for the Luxi fonts are included in the file '`COPYRIGHT.BH`', as well as in the License document. For further information, please contact **<**design@bigelowandholmes.com**>** or **<**info@urwpp.de**>**, or consult the URW++ web site `<URL:http://www.urwpp.de>`.

7. Credits

This section lists the credits for the XFree86 4.5.0 release. For a more detailed breakdown, refer to the CHANGELOG file in the XFree86 source tree, the cvs-commit archives `<URL:http://www.mail-archive.com/cvs-commit@xfree86.org/maillist.html>`, or the 'cvs log' information for individual source files.

New Features, Enhancements and Updates:

Xterm enhancements and updates:
Thomas Dickey

Integrate TinyX into the mainline XFree86 build:
X-Oz Technologies

Intel i915GM support, dual head i830/i855/i915 support:
Tungsten Graphics, Alan Hourihane, Keith Whitwell

Automatic configuration enhancements:
X-Oz Technologies, David Dawes

Distributed Multihead X:
Kevin Martin, Rik Faith

Preliminary work on SunOS/SPARC and IRIX ports:
Marc La France

Integration:

General Integration of Submissions:
David H. Dawes, Marc La France, Alan Hourihane, Ivan Pascal.

DRI Integration:
Alan Hourihane, David H. Dawes.

Release Engineering:
David H. Dawes.

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Webmaster:
  Georgina O. Economou

Hosting:
  Internet Systems Consortium, Inc `<URL:http://www.isc.org/>`.

8. Attributions/Acknowledgements

This product includes software developed by The XFree86 Project, Inc (http://www.xfree86.org/) and its contributors.

This product includes software that is based in part of the work of the FreeType Team (http://www.freetype.org).

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This product includes software developed by Christopher G. Demetriou.

This product includes software developed by the NetBSD Foundation, Inc. and its contributors

This product includes software developed by X-Oz Technologies (http://www.x-oz.com/).

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`$XFree86: xc/programs/Xserver/hw/xfree86/doc/sgml/RELNOTES.sgml,v 1.135 2005/03/17 01:11:56 dawes Exp`