Release Notes for X11R7.5

The X.Org Foundation [1]

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These release notes contains information about features and their status in the X.Org Foundation X11R7.5 release.

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Introduction to the X11R7.5 Release

This release is the sixth modular release of the X Window System. The next full release will be X11R7.6 and is expected in 2010.

Unlike X11R1 through X11R6.9, X11R7.x releases are not built from one monolithic source tree, but many individual modules. These modules are distributed as individual source code releases, and each one is released when it is ready, instead of only when the overall window system is ready for release. The X11R7.x releases are made by "rolling up" the individual module releases into a collection that is often affectionately called the "*katamari*" by the developers.

The X11R7.5 release does not include all of the software formerly included in the previous X Window System releases. It is designed to be a reasonable baseline from which to start when building the window system for the first time for a new installation, distribution, or package set. It does not provide a full desktop environment, expecting a more feature rich set of applications to be installed from one of the several excellent desktop environments available for the X Window System. The X.Org developers continue to maintain and produce new releases of much of the software that was formerly in the main window system releases but is no longer included in the katamari releases, including many of the Athena Widgets desktop applications that were provided as samples in previous window system versions.

Once their window system build is established, most builders watch for announcements of individual module updates on the xorg-announce mailing list[2] and update to those as needed. The X.Org Foundation currently releases the X Window System katamari releases approximately once a year, but many modules, especially the X servers and drivers, are updated more frequently between those releases.

For help with how to build and develop in the modular tree see the Modular Developer's Guide[3] in the X.Org wiki.

We encourage you to submit bug fixes and enhancements to freedesktop.org's bug tracking system[4] using the xorg product, and to discuss them on <xorg@lists.freedesktop.org>. More details on patch submission and review process are available on the SubmittingPatches[5] page of the X.Org wiki.

The release numbering is based on the original MIT X numbering system. X11 refers to the version of the network protocol that the X Window system is based on: Version 11 was first released in 1988 and has been stable for 21 years, with only upward compatible additions to the core X protocol, a record of stability envied in computing. Formal releases of X started with X version 9 from MIT; the first commercial X products were based on X version 10. The MIT X Consortium and its successors, the X Consortium, the Open Group X Project Team, and the X.Org Group released versions X11R3 through X11R6.6. Since the founding of the X.Org Foundation in early 2004, many further releases have been issued, from X11R6.7 to the current 7.5.

The next section describes what is new in the latest version (7.5) compared with the previous full release (7.4).

Summary of new features in X11R7.5

This is a sampling of the new features in X11R7.5. A more complete list of changes can be found in the ChangeLog files that are part of the source of each X module.

- *Multi-Pointer X (MPX)* provides the user with multiple independent mouse cursors and multiple independent keyboard foci. Each cursor is a true system cursor and different pointers can operate in multiple applications simultaneously.
- *Input device properties* allow you to attach properties to a device. These properties can be of arbitrary type and can be changed without the server having to know their details.

- The *X Input Extension version 2.0 (XI2)* is designed to replace both core input processing and prior versions of the X Input Extension. Besides MPX, it provides a number of other enhancements over version 1.5, including:
  - use of XGE and GenericEvents.
  - explicit device hierarchy of master and slave devices.
  - the ability for devices to change capabilities at runtime.
  - raw device events
- *Resize, Rotate and Reflect Extension (RANDR) version 1.3* builds on the changes made with version 1.2 and adds some new capabilities without fundmentally changing the extension again. The following features are added in this version:

  Projective Transforms

  The implementation work for general rotation support made it trivial to add full projective transformations. These can be used to scale the screen up/down as well as perform projector keystone correct or other effects.

  Panning

  Panning was removed with RandR 1.2 because the old semantics didn't fit any longer. With RandR 1.3 panning can be specified per crtc.
- The *DRI2 extension* is designed to associate and access auxillary rendering buffers with an X drawable. It is a essentially a helper extension to support implementation of direct rendering drivers/libraries/technologies. The first consumer of this extension is a direct rendering OpenGL driver, but the DRI2 extension is not designed to be OpenGL specific. Work is underway to utilize DRI2 for the Video Decode and Presentation API for Unix (VPDAU) as well. Direct rendering implementations of OpenVG, Xv, cairo and other graphics APIs should find the functionality exposed by this extension helpful and hopefully sufficient.
- *Video and input driver enhancements*. Please see the ChangeLog files for individual drivers; there are far too many updates to list here.
- ... and the usual assortment of correctness and crash fixes.

Overview of X11R7.5

On most platforms, X11R7.5 has a single hardware-driving X server binary called **Xorg**. This binary can dynamically load the video drivers, input drivers, and other modules that are needed. **Xorg** has currently has support for Linux, Solaris, and some BSD OSs on Alpha, PowerPC, IA-64, AMD64, Intel x86, Sparc, and MIPS platforms.

Additional specialized X server binaries may be found depending on the platform and build configuration, including:

Xdmx

is a proxy X server that uses one or more other X servers as its display devices. It provides multi-head X functionality for displays that might be located on different machines.

Xnest

is a nested X server, that operates as both an X client and X server. **Xnest** is a client of the real server which manages windows and graphics requests on its

behalf. **Xnest** is a server to its own clients, and manages windows and graphics requests on their behalf. To these clients, it appears to be a conventional server.

Xephyr

is a X server that outputs to a window on a pre-existing "host" X display. Unlike **Xnest** which is an X proxy, and thus limited to the capabilities of the host X server, **Xephyr** is a full X server which uses the host X server window as a "framebuffer" via fast SHM XImages.

Xvfb

is a virtual framebuffer X server that can run on machines with no display hardware and no physical input devices. It emulates a dumb framebuffer using virtual memory.

Xquartz

is an X server that interacts with the MacOS X native Aqua window system, displaying windows on the Mac desktop and accepting input from the Mac system devices, allowing X11 applications to be used in a native Mac desktop session.

Xwin

is an X server that runs under the Cygwin environment, interacting with the Microsoft Windows native window system, displaying windows on the Windows desktop and accepting input from the Windows system devices, allowing X11 applications to be used in a native Windows desktop session.

Details of X11R7.5 components

Video Drivers

X11R7.5 includes the following video drivers:

Driver Name	Description	Further Information
`apm`	Alliance Pro Motion	README.apm[6]
`ark`	Ark Logic	
`ast`	ASPEED Technology	
`chips`	Chips & Technologies	README.chips[6], chips(4)[6]
`cirrus`	Cirrus Logic	
`fbdev`	Linux framebuffer device	fbdev(4)[6]
`geode` (*)	AMD Geode GX and LX	

glint	3Dlabs, TI	glint(4)[6]
i128	Number Nine	README.I128[6], i128(4)[6]
i740	Intel i740	README.i740[6]
imstt	Integrated Micro Solns	
intel	Intel i8xx/i9xx	README.intel[6], intel(4)[6]
mach64	ATI Mach64	README.ati[6]
mga	Matrox	mga(4)[6]
neomagic	NeoMagic	neomagic(4)[6]
newport (-)	SGI Newport	README.newport[6], newport(4)[6]
nsc	National Semiconductor	nsc(4)[6]
nv	NVIDIA	nv(4)[6]
r128	ATI Rage128	README.r128[6], r128(4)[6]
radeon	ATI Radeon	radeon(4)[6]
rendition	Rendition	README.rendition[6], rendition(4)[6]
s3	S3 (not ViRGE or Savage)	
s3virge	S3 ViRGE	README.s3virge[6], s3virge(4)[6]
savage	S3 Savage	savage(4)[6]
siliconmotion	Silicon Motion	siliconmotion(4)[6]
sis	SiS	README.SiS[6], sis(4)[6]
sisusb	SiS USB	sisusb(4)[6]
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 Voodoo Banshee, 3, 4 & 5	tdfx(4)[6]
tga	DEC TGA	README.DECtga[6]
trident	Trident	trident(4)[6]
tseng	Tseng Labs	
v4l	Video4Linux	v4l(4)[6]
vesa	VESA	vesa(4)[6]
vmware	VMware guest OS	vmware(4)[6]
voodoo	3Dfx Voodoo 1 & 2	voodoo(4)[6]
wsfb	Workstation Framebuffer	wsfb(4)[6]
xgi	XGI	xgi(4)[6]
xgixp	XGI XP	xgixp(4)[6]

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.

Input Drivers

X11R7.5 includes the following input drivers:

Driver Name	Description	Further Information
`acecad`	Acecad Flair	acecad(4)[6]
`aiptek(*)`	Aiptek USB tablet	aiptek(4)[6]
`evdev(*)`	Linux kernel EvDev	evdev(4)[6]
`joystick`	Joystick	joystick(4)[6]
`kbd`	generic keyboards (non-evdev systems)	kbd(4)[6]
`mouse`	most mouse devices (non-evdev systems)	mouse(4)[6]
`synaptics`	Synaptics & ALP touchpads	synaptics(4)[6]
`vmmouse`	VMWare virtual mouse	vmmouse(4)[6]
`void`	dummy device	void(4)[6]

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

Xorg server

Loader and Modules

The Xorg server relies on the operating system's native module loader support for handling program modules. The X server makes use of modules for video drivers, X server extensions, input device drivers, framebuffer layers, and internal components used by some drivers (like XAA & EXA).

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, 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 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.

Configuration File

The Xorg 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 xorg.conf(5)[6] manual page.

Note that this release features significant improvements for running the server without a configuration file, so many users may find that that they don't need a configuration file.

If you do need to customize the configuration file, see the xorg.conf manual page[7] . You can also check the driver-specific manual pages and the related documentation (found at driver tables) also.

The recommended method for generating a configuration file is to use the Xorg server itself. Run as root:

```
Xorg -configure
```

and follow the instructions.

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 Xorg(1)[8] manual page.

XAA

The XFree86 Acceleration Architecture (XAA) was completely rewritten from scratch for XFree86 4.x and is used in X11R7.5. Most drivers implement acceleration by making use of the XAA module.

EXA

EXA was created as a new driver acceleration architecture to replace XAA. EXA was designed specifically to accelerate Render operations. This release features improved driver support for EXA. See the individual driver changelogs for details.

Multi-head

Some multi-head configurations are supported in X11R7.5. Support for multiple PCI/AGP cards may require a kernel with changes to support VGA arbitration.

One of the main problems is with drivers not sufficiently initializing cards that were not initialized 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).

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.

DDC

The VESA® Display Data Channel (DDC™) standard allows the monitor to tell the video card (or in 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 can use this information to set the default monitor parameters, or to warn about monitor sync limits if those provided in the configuration file don't match those that are detected.

Changed behavior caused by DDC.

Several drivers use 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.

GLX and the Direct Rendering Infrastructure (DRI)

Direct rendered OpenGL® support is provided for several hardware platforms by the Direct Rendering Infrastructure (DRI). Further information about DRI can be found at the DRI Project's web site[9]. The 3D core rendering component is provided by Mesa[10].

Of note is that this release supports building the X server using the system-wide libdrm. Previously, drm was kept in the server's tree and loaded as a module, rather than using the standard OS mechanisms for managing shared libraries of code. This requires that the server be built using a version of libdrm of 2.3.0 or newer if it is to use DRM.

Terminate Server keystroke

The Xorg server has previously allowed users to exit the server by pressing the keys **Control** + **Alt** + **Backspace**. While this function is still enabled by default in this release, the keymap data usually used with Xorg, from the xkeyboard-config project, has been modified to not map that sequence by default, in order to reduce the chance that inexperienced users will accidentally destroy their work.

Users who wish to have this functionality available by default may enable it via the XKB configuration option "`terminate:ctrl_alt_bksp`". For instance, the **setxkbmap** command can be used to enable this by running:

```
setxkbmap -option "terminate:ctrl_alt_bksp"
```

Many desktop environments include XKB configuration options in their preferences to enable this as well.

X Server startup state

The X servers in the X11R7.5 release now start by default with an empty black screen and do not draw the mouse cursor until a client sets the cursor image. To restore the classic behavior of starting with the grey weave pattern and × cursor, start the X server with the `-retro` option.

Font support

Details about the font support in X11R7.5 can be found in the README.fonts[11] document.

Default font installation directory

Previous versions of X installed font files under the `lib/X11/fonts` subdirectory of the X installation directory (for instance, in X11R6 releases, `/usr/X11R6/lib/X11/fonts` was commonly used). This release changes the default installation path to the `fonts` subdirectory of the `datadir` setting from the GNU autoconf configuration. For instance, if the fonts are configured with **`./configure --prefix=/usr`**, they will be installed under subdirectories of `/usr/share/fonts/X11`. The font module configure scripts all take an option of `--with-fontrootdir=`*`PATH`* to override the default. If `--with-fontrootdir` is not specified, the `fontutil` pkg-config file will be consulted to find the `fontrootdir` specified when the `fontutil` module was installed.

Bitmap font compression methods

The X11R7.5 release supports PCF format bitmap fonts stored uncompressed or compressed via the **compress**, **gzip**, or **bzip2** programs. To utilize bzip2 compression, the `libXfont` and **mkfontscale** modules must be built with the `--with-bzip2` — all other methods are enabled by default.

To specify which compression method to use when installing a font module from X11R7.5 the configure scripts accept an option of `--with-compression=`*`TYPE`*, where *`TYPE`* may be `none`, `compress`, `gzip`, or `bzip2`.

Type1 Font support

Previous versions of X came with two Postscript Type1 font backends. The functionality from the "Type1" backend has been replaced by the Type1 support in the "FreeType" backend.

CID Font support

The CID-keyed font format was designed by Adobe Systems for fonts with large character sets. The CID-keyed format is obsolete, as it has been superseded by other formats such as OpenType/CFF and support for CID-keyed fonts has been removed from X11.

Build changes and issues

Silent build rules

Most of the modules in this release use the `AM_SILENT_RULES` option of GNU automake 1.11. When building the software, most output will show an abbreviated format for the commands being run, such as:

```
CC xmen.o
```

To enable verbose output, showing all the arguments to the commands being run, add the flag `V=1` to the **make** command line or add the flag `--disable-silent-rules` to the configure command.

New configure options for font modules

Several new options have been added to the configure scripts for font modules in this release. See the Font support section of this document for details of the `--with-fontrootdir=`*`PATH`* and `--with-compression=`*`TYPE`* options.

Changes to extension headers

The C language header files for a number of X11 protocol extensions were refactored in this release to better split the protocol definitions and the client library definitions. Efforts were made to retain compatibility for existing software, but use of some headers may now trigger warnings suggesting including new or more appropriate headers instead.

Since these changes were made to files in both the `proto` and `lib` modules for each extension, builders upgrading individual modules will have to update these modules in unison to avoid breaking builds of software using the headers from these modules.

Miscellaneous

This section describes other items of note for the X11R7.5 release.

Socket directory ownership and permissions

The socket directories created in `/tmp` are now required to be owned by root and have their sticky-bit set. If the permissions are not set correctly, the component using this directory will print an error message and fail to start. Common socket directories that are known to be affected include:

```
/tmp/.font-unix
/tmp/.ICE-unix
/tmp/.X11-unix
```

These directories are used by the font server (**xfs**), applications using the Inter-Client Exchange protocol (ICE) and the X server, respectively.

There are several solutions to the problem of when to create these directories. They could be created at install time by the system's installer if the `/tmp` dir is persistent. They could be created at boot time by the system's boot scripts (e.g., the `init.d`

scripts). Or, they could be created by PAM modules at service startup or user login time.

The solution chosen is platform dependent, and the system administrator should be able to handle creating those directories on any systems that do not have the correct ownership or permissions.

Composite exposes extra visuals

When the Composite extension is enabled, a new visual is created. This visual is different from the other visuals used by X applications in that it includes an alpha component. It is used by the compositing manager and other Composite aware applications.

Most X applications ignore this visual since it is not useful to them; however some applications mistakenly try to use it, which will cause them to fail. An environment variable, XLIB_SKIP_ARGB_VISUALS, was added to the X11 library to hide this visual from applications that mistakenly try to use it. If an application fails only when the Composite is enabled, try setting this environment variable before starting the application.

Deprecated components and removal plans

This section lists current plans for removal of obsolete or deprecated components in the X.Org releases. As our releases are open source, users who continue to require these can find the source in previous releases and continue to use these, but the X.Org Foundation and its volunteers have decided the burden of continued maintenance and distribution in the core X11 releases outweighs the benefits of doing so. In some cases, this is simply because no one has volunteered to do continued maintenance, so if software is listed here that you need, you can contact <xorg@lists.freedesktop.org> to volunteer to take over maintainership, either inside or outside of the Xorg release process.

Future Removals

DGA version 2

DGA 2.0 is included in 7.5. Documentation for the client libraries can be found in the XDGA(3)[12] man page. DGA should be considered deprecated; if you are relying on it, please let us know what you need it for so we can find better solutions.

Input device discovery via HAL

The Xorg server currently uses the HAL framework[13] to discover connected input devices, receive notification of hotplug events for them, and to retrieve configuration parameters for them. The HAL maintainers have deprecated HAL, so the X.Org developers are investigating alternatives. As a result, configuration of input devices via HAL `*.fdi` files may not be supported in future Xorg server releases.

Xsdl server

The experimental Xsdl server has never been finished or maintained, and will be removed in future X server releases.

Removed in this Release

Xprint

The Xprint server and extension have been removed in this release. The libXaw8 variant of the Athena Widgets which added Xprint widgets has been removed from this release. Xprint support in a number of client programs has also been removed.

kdrive servers

The kdrive X servers for vesa, ati, chips, epson, i810, igs, ipaq, itsy, mach64, mga, neomagic, nvidia, pcmcia, pm2, r128, savage, sis300, sis530, smi, trident, trio, ts300, via, and vxworks have been removed in this release. Most of these have not worked or been maintained in recent releases.

Unmaintained extensions

Support has been removed from the X servers for the following extensions, which were obsolete, not widely used, or not working:

- AppGroup
- EVI
- FontCache
- MIT-SUNDRY-NONSTANDARD
- TOG-CUP
- XTrap
- XFree86-Misc
- XEvIE

Xorg configuration utilities

The **xorgcfg** GUI and **xorgconfig** CLI utilities have been removed in this release. See the Configuration File section for alternative methods of Xorg configuration.

ioport

The ioport utility and its aliases (inb, inw, inl, outb, outw, and outl) for manipulating I/O space addresses directly have been removed in this release.

Attributions/Acknowledgements/Credits

This section lists the credits for the X11R7.5 release. For a more detailed breakdown, refer to the ChangeLog file in the source tree for each module, the history in the xorg product in freedesktop.org's git repositories[14] or the '`git log`' information for individual source files.

The X Window System has been a collaborative effort from its inception. Our apologies for anyone or organization inadvertently overlooked. Many individuals (including major contributors) who worked on X are represented by their employers in this list. If you feel we have left anyone out, please let us know.

These people contributed in some way to X11R7.5:

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Adam Hoka
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Alex Villacís Lasso
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Andrew Randrianasulu
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Asbjøannes
Barry Scott
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Ben Gamari
Ben Hutchings
Ben North
Ben Skeggs
Benjamin Close
Benjamin Defnet
Benjamin Herrenschmidt
Benjamin Tissoires
Bernhard R. Link
Bernhard Rosenkraenzer
Bill Nottingham
Bob Ham
Bob Long
Brad Smith
Branden Robinson
Brian Rogers
Brice Goglin
Bryce Harrington
Calvin Fong
Caolan McNamara
Carl Worth
Charlie
Chris Ball
Chris Salch
Chris Wilson
Christiaan van Dijk
Christian Aistleitner
Christian Beier
Christian Koenig
Josh Triplett
Juan RP
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Kim Woelders
Kristian Høgsberg
Krzysztof Halasa
Kshitij Kulshreshtha
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Lee Leahu
Li Peng
Li Shao Hua
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Lukasz Kurylo
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Mattia Dongili
Maxim Levitsky
Micah Dowty
Michael Chapman
Michael Cree
Michael Lorenz
Michael Scherer
Michael Verret
Michael Vogt
Michael Witrant
Michael Witten
Michel Dänzer

Christian Schmitt
Christoph Brill
Christoph Pfister
Coleman Kane
Colin Guthrie
Colin Harrison
Cooper Yuan
Corbin Simpson
Dan
Dan Nicholson
Daniel Drake
Daniel Stone
Daniel Vetter
Darren Smith
Dave Airlie
Dave Miller
David Jander
David Marx
David Miller
David Nolden
David Nusinow
David Schleef
Dennis Kasprzyk
Derek Upham
Derek Wang
Diego Elio 'Flameeyes' Pettenò
Dima Kogan
Dmitry Torokhov
Dodji Seketeli
Donald Kayser
Donnie Berkholz
Doug Chapman
Drew Parsons
Eamon Walsh
Ed Catmur
Eduard Bagrov
Eduard Fuchs
edward shu
Egbert Eich
Emilio Jesús Gallego Arias
Eric Anholt
Eric Paris
Éric Piel
Erik Andren
Erkin Bahceci
Evgeny M. Zubok
Eygene Ryabinkin
Fabio
Federico Mena Quintero
Fedor P. Goncharov (Fredy)
Felix Kuehling
Fernando Carrijo
Filippo Giunchedi
Francis Giraldeau
Francisco Jerez
Fredrik Höglund
Gaetan Nadon
George Peter Staplin
Mikhail Gusarov
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Nicos Gollan
Niels de Vos
Nirbheek Chauhan
Oliver McFadden
Olivier Blin
Olivier Fourdan
Otavio Salvador
Owain Gordon Ainsworth
Owen W. Taylor
parag
Patrick Haller
Paul Bender
Paul Menzel
Paul "TBBle" Hampson
Pauli Nieminen
Paulo César Pereira de Andrade
Paulo Ricardo Zanoni
Peter Alfredsen
Peter Åstrand
Peter Breitenlohner
Peter Harris
Peter Hutterer
Peter Korsgaard
Petr Salinger
Philip Langdale
Pierre Ossman
Pierre Willenbrock
Pierre-Loup A. Griffais
Rafael Ávila de Espíndola
RALOVICH, Kristóf
Rami Ylimaki
Ramon van der Stelt
Rémi Cardona
Richard Hughes
Robert Lowery
Robert Noland
Roland Bär
Roland Scheidegger
Ross Burton
Ryan Hill
Ryan Lortie
Samuel Thibault
Sascha Hlusiak
Sayamindu Dasgupta
Shaohua Li
Shelley Gong
Shuang He
Shunichi Fuji
Simon Farnsworth
Simon Munton
Simon Thum

George Sapountzis
George Staplin
Giuseppe Bilotta
Goneri Le Bouder
Guillem Jover
Hans de Goede
Hasso Tepper
Havoc Pennington
Helge Bahmann
Henrik Rydberg
Henry unbongo
Hong Liu
Hugo Jacques
Ian Romanick
Imranullah Syed
Ivaylo Boyadzhiev
Jakob Bornecrantz
Jakub Bogusz
James Cloos
Jamey Sharp
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Jason Vas Dias
Jasper Lievisse Adriaanse
Jay Cotton
Jeff Smith
Jens Granseuer
Jens Herden
Jeremy C. Reed
Jeremy Huddleston
Jeremy Jay
Jeremy Lainé
Jeremy Uejio
Jerome Glisse
Jerome Pinot
Jesse Adkins
Jesse Barnes
Jesse Ruffin
Jie Luo
Jim Huang
Jochen Voss
Joe Krahn
Joel Bosveld
John Hein
John McKernan
John Nielsen
John Tapsell
Jon TURNEY
Søren Hauberg
Søren Sandmann Pedersen
Stefan Dirsch
Stijn van Drongelen
Stuart Bennett
Stuart Kreitman
Tero Saarni
Theppitak Karoonboonyanan
Thomas Bodzar
Thomas Jaeger
Thomas Klausner
Thomas Petazzoni
Thorvald Natvig
Tiago Vignatti
Tibi Nagy
Tilman Sauerbeck
Timo Aaltonen
Tom Jaeger
Tomas Carnecky
Tomas Janousek
Topi Kanerva
Tormod Volden
vehemens
Vincent Mussard
walter
Werner LEMBERG
Will Thompson
William Grant
Winfried Grünewald
Wolke Liu
Wu Fengguang
Xake
Xavier Bestel
Xiang, Haihao
Xue Wei
Y.C. Chen
Yaakov Selkowitz
Yan Li
Yang Zhao
Yann Droneaud
Yannick Heneault
Yinan Shen
<50724><50976><50672>(Yu-yeon Oh)
Zdenek Kabelac
Zhao Yakui
Zhenyu Wang
Zou Nan hai

This product includes software developed by:

2d3d Inc.
3Dlabs Inc. Ltd.
Aaron Plattner
Adam de Boor
Adam Jackson
Adobe Systems Inc.
Lars Knoll
Lawrence Berkeley Laboratory
Leif Delgass
Lennart Augustsson
Leon Shiman
Lexmark International Inc.

After X-TT Project
AGE Logic Inc.
Alan Coopersmith
Alan Cox
Alan Hourihane
Alexander Gottwald
Alex Deucher
Alex Williamson
Anders Carlsson
Andreas Luik
Andreas Monitzer
Andreas Robinson
Andrei Barbu
Andrew C Aitchison
Andy Ritger
Angus Lees
Ani Joshi
Anton Zioviev
Apollo Computer Inc.
Apple Computer Inc.
Ares Software Corp.
AT&T Inc.
ATI Technologies Inc.
BEAM Ltd.
Benjamin Herrenschmidt
Benjamin Rienfenstahl
Ben Skeggs
Bigelow and Holmes
Bill Reynolds
Bitstream Inc.
Bogdan Diaconescu
Branden Robinson
Brian Fundakowski Feldman
Brian Goines
Brian Paul
Bruno Haible
Bryan Stine
Carl Switzky
Catharon Productions Inc.
Charles Murcko
Chen Xiangyang
Chisato Yamauchi
Chris Constello
Christian Zietz
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Concurrent Computer Corporation
Conectiva S.A.
Corin Anderson
Craig Struble
Daewoo Electronics Co. Ltd.
Dag-Erling Smørgrav
Dale Schumacher
Damien Miller
Daniel Berrange
Daniel Borca
Daniel Stone
Linus Torvalds
Luc Verhaegen
Machine Vision Holdings Inc.
Manfred Brands
Marc Aurele La France
Mark Adler
Mark J. Kilgard
Mark Leisher
Mark Smulders
Mark Vojkovich
Marvin Solomon
Massachusetts Inst. Of Technology
Matrox Graphics
Matthew Grossman
Matthias Hopf
Matthieu Herrb
Metro Link Inc.
Michael Bax
Michael H. Schimek
Michael P. Marking
Michael Schimek
Michael Smith
Michel Dänzer
Mike A. Harris
Mike Harris
Ming Yu
MIPS Computer Systems Inc.
National Semiconductor
NCR Corporation Inc.
NetBSD Foundation
Netscape Communications Corp.
Network Computing Devices Inc.
Nicholas Joly
Nicholas Miell
Nicholas Wourms
Nicolai Haehnle
Noah Levitt
Nolan Leake
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Nozomi YTOW
NTT Software Corporation
Number Nine Computer Corp.
Number Nine Visual Technologies
NVIDIA Corporation
Oivier Danet
Oki Technosystems Laboratory Inc.
Olivetti Research Limited
OMRON Corporation
Open Software Foundation
OpenedHand Ltd
Orest Zborowski
Owen Taylor
Pablo Saratxaga
Panacea Inc.
Panagiotis Tsirigotis
Paolo Severini

Daniver Limited
Daryll Strauss
Data General Corporation
Dave Airlie
David Bateman
David Dawes
David E. Wexelblat
David Holland
David J. McKay
David McCullough
David Mosberger-Tang
David Reveman
David S. Miller
David Woodhouse
Davor Matic
Deron Johnson
Digeo Inc.
Digital Equipment Corporation
Dirk Hohndel
Dmitry Golubev
Donnie Berkholz
DOS-EMU-Development-Team
Doug Anson
Drew Parsons
Earle F. Philhower III
Edouard TISSERANT
Eduard Fuchs
Eduardo Horvath
Egbert Eich
Egmont Koblinger
Elliot Lee
Eric Anholt
Eric Fortune
Eric Sunshine
Erik Fortune
Erik Nygren
Evans & Sutherland Computer Corp.
Fabio Massimo Di Nitto
Fabrizio Gennari
Felix Kuehling
Felix Kühling
Finn Thoegersen
Francesco Zappa Nardelli
Frank C. Earl
Frederic Lepied
Fredrik Höglund
Free Software Foundation
Fujitsu Limited
Fujitsu Open Systems Solutions Inc.
Fuji Xerox Co. Ltd.
Geert Uytterhoeven
George Fufutos
Gerrit Jan Akkerman
Gerry Toll
Glenn G. Lai
GNOME Foundation
Go Watanabe
Google Summer of Code participants
Pascal Haible
Patrick Lecoanet
Patrick Lerda
Paul Anderson
Paul Elliott
Paul Mackerras
Peter Breitenlohner
Peter Kunzmann
Peter Trattler
Philip Homburg
Philip Langdale
Precision Insight Inc.
Prentice Hall
Quarterdeck Office Systems
Radek Doulik
Ralf Habacker
Randy Hendry
Ranier Keller
Red Hat Inc.
Regis Cridlig
Rene Cougnenc
Richard A. Hecker
Richard Burdick
Rich Murphey
Rickard E. Faith
Rik Faith
Robert Chesler
Robert Millan
Robert V. Baron
Robin Cutshaw
Roland Mainz
Roland Scheidegger
Ronny Vindenes
Russ Blaine
Ryan Breen
Ryan Lortie
Ryan Underwood
S3 Graphics Inc.
Sam Leffler
Santa Cruz Operation Inc.
SciTech Software
Scott Laird
Sebastien Marineau
Shigehiro Nomura
ShoGraphics Inc.
Shunsuke Akiyama
Silicon Graphics Computer Systems
Silicon Integrated Systems Corp
Silicon Motion Inc.
Simon P. Cooper
Snitily Graphics Consulting Services
Sony Corporation
Søren Sandmann
SRI
Stanislav Brabec
Stefan Dirsch
Stephane Marchesin
Stephan Lang

Greg Kroah-Hartman
Gregory Mokhin
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GROUPE BULL
Guy Martin
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Hewlett-Packard Company
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Holger Veit
Hong Bo Peng
Howard Greenwell
Hummingbird Communications Ltd.
Ian Romanick
IBM Corporation
Inst. of Software Academia Sinica
Intel Corporation
INTERACTIVE Systems Corporation
Itai Nahshon
Ivan Kokshaysky
Ivan Pascal
Jakub Jelinek
James Tsillas
Jason Bacon
Jaymz Julian
Jean-loup Gailly
Jeff Hartmann
Jeff Kirk
Jeffrey Hsu
Jehan Bing
Jeremy C. Reed
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Jesse Barnes
Jim Gettys
Jim Tsillas
John Dennis
John Harper
John Heasley
Jonathan Adamczewski
Jon Block
Jon Smirl
Jon Tombs
Jorge Delgado
José Fonseca
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Joseph V. Moss
Julio M. Merino Vidal
Juliusz Chroboczek
Jyunji Takagi
Kaleb Keithley
Steven Lang
Stuart Kreitman
Sun Microsystems Inc.
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Sven Luther
Takis Psarogiannakopoulos
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Thomas E. Dickey
Thomas G. Lane
Thomas Hellström
Thomas Mueller
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Thomas Winischhofer
Thomas Wolfram
Thorsten.Ohl
Tiago Gons
Tilman Sauerbeck
Todd C. Miller
Tomohiro KUBOTA
Torrey Lyons
Torrey T. Lyons
TOSHIBA Corp.
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Unicode Inc.
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Wittawat Yamwong
Wyse Technology Inc.
X Consortium

Kazushi (Jam) Marukawa
Kazuyuki (ikko-) Okamoto
Kean Johnston
Keith Packard
Keith Whitwell
Kensuke Matsuzaki
Kevin E. Martin
Kristian Høgsberg
Larry Wall
XFree86 Project Inc.
Xi Graphics Inc.
X-Oz Technologies
X-TrueType Server Project
Yu Shao
Zack Rusin
Zephaniah E. Hull
Zhenyu Wang

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Notes

1. http://www.x.org/wiki/XorgFoundation
2. http://lists.freedesktop.org/mailman/listinfo/xorg-announce
3. http://wiki.x.org/wiki/ModularDevelopersGuide
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