

KDE 2.0 Review

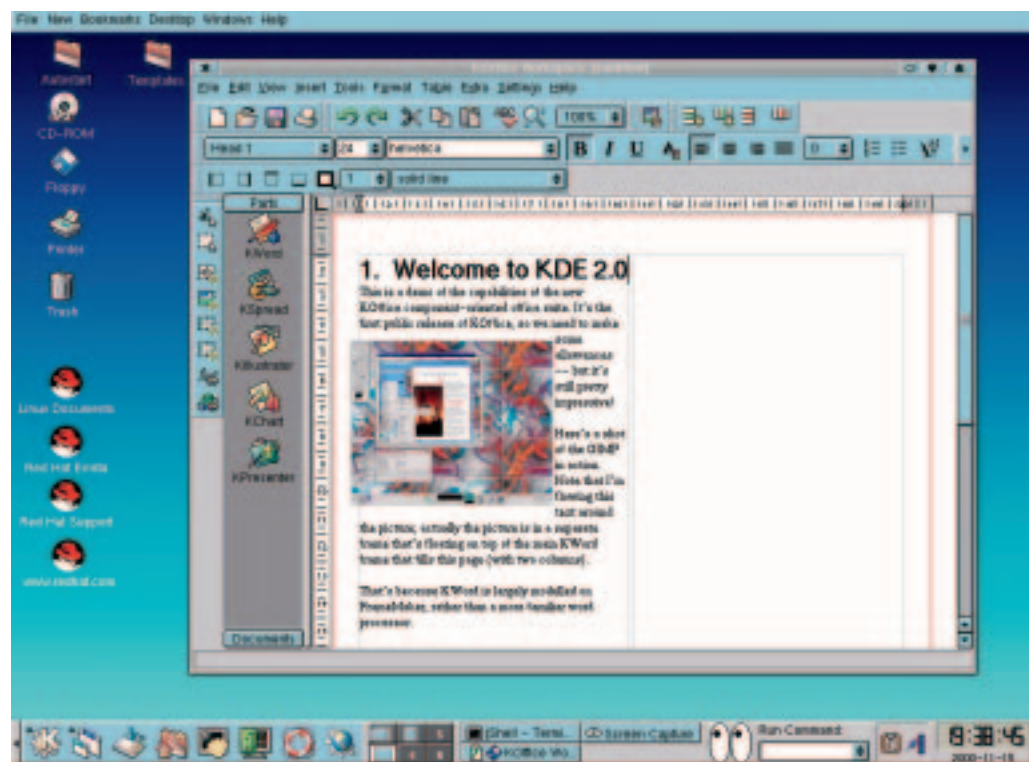
THEY ARE BACK

CHARLIE STROSS



Some of us fondly remember the golden days of the command prompt, but now with X-Windows comes a new dawn – KDE. Charlie Stross discusses how to get the most out of it...

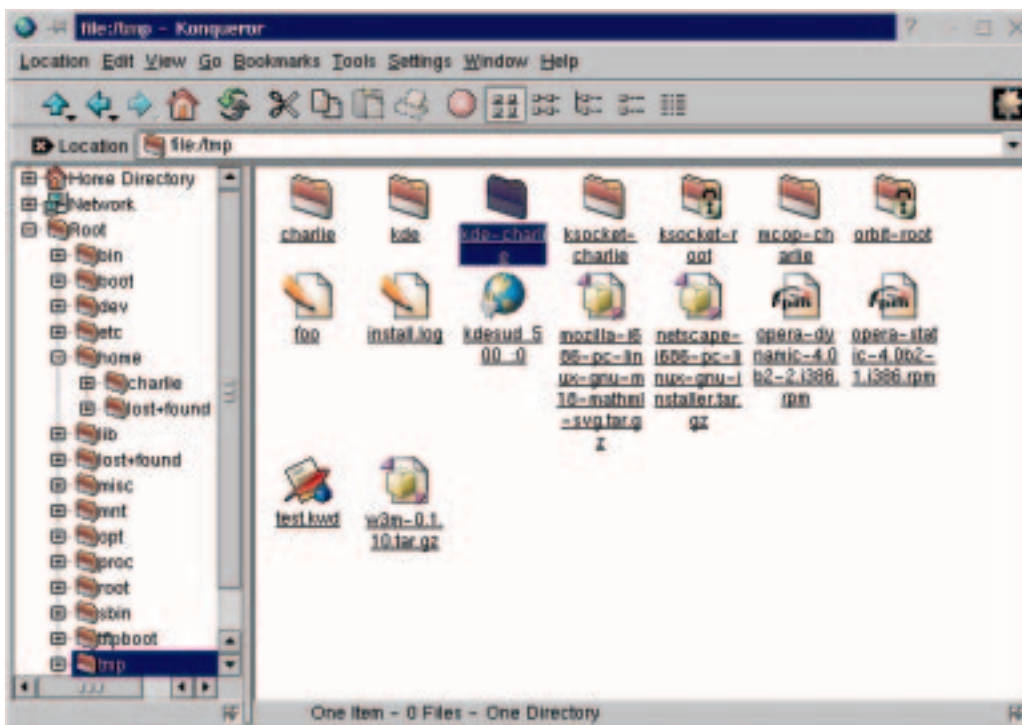
KOffice – shown here editing a KWord document – is a neat integrated office suite, new with KDE 2.0



When you turn on a computer, these days you expect to see a graphical desktop with folders, windows, icons, and the usual panoply of a mouse-driven interface. Linux is based on UNIX, which predates the graphical desktop: but Linux, too, can have a desktop. It's just that the Linux desktops are separate from the Linux operating system (as

Windows used to be separate from DOS), and you've got a choice of desktops. Probably the most popular desktop for Linux today is KDE (short for "K" Desktop Environment – nobody's really sure what the K stands for), followed by GNOME.

All current consumer Linux distributions come with one of KDE or GNOME systems pre-installed.



KOffice – shown here editing a KWord document – is a neat integrated office suite, new with KDE 2.0

(SuSE, Mandrake, Corel, Storm and Caldera use KDE; Red Hat uses GNOME but supplies KDE as an alternative. Debian comes with GNOME.)

Both GNOME and KDE share a common ancestry. In 1996, a bunch of Linux hackers got annoyed by the lack of high-quality integrated desktops for Linux. They started on a project to develop KDE – the K Desktop Environment. To build this, they used the Qt widget set from Troll Tech, a small Norwegian company. Qt is a very useful set of tools written in C++; unfortunately they weren't 100% free open source products at that time. For this reason, a group of dissident developers set up the rival GNOME project. In 1999, Troll Tech announced that Qt release 2.0 would be available under the GNU General Public License on open source operating systems; this effectively means that versions of KDE based on Qt 2.0 or later are true open source (although the earlier KDE versions 1.0 through 1.2, which relied on Qt 1.44, are not officially open source).

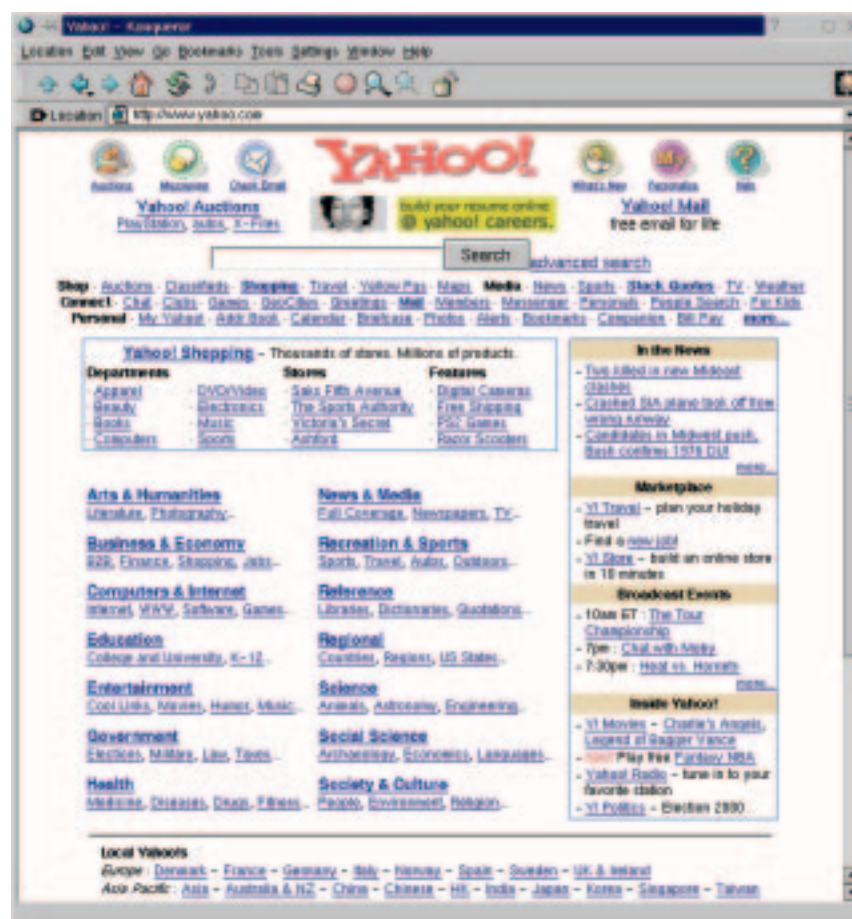
The newest release of KDE, KDE 2.0, came out in October 2000. KDE 2.0 is a substantial re-write of KDE 1.2, and is based on the Qt 2.2.1 widget set (making it fully compatible with the open source definition).

Under the hood

KDE 2.0 is based on a raft of technologies that interlock to provide a seamless user experience – unlike earlier Linux (and UNIX) desktops. The core technologies behind KDE are the Desktop Communication Protocol (DCOP), the I/O libraries (KIO), the component object model (KParts), an XML-based C++ class for specifying user interfaces, and a standards-compliant HTML rendering engine (KHTML).

DCOP is a communications protocol used for message passing between KDE applications; it also allows KDE programs to be driven by remote control using an XML-RPC to DCOP gateway. (This basically serves a purpose equivalent to OLE on a Windows system; KDE applications can farm tasks out to each other, or be scripted by a language with a DCOP

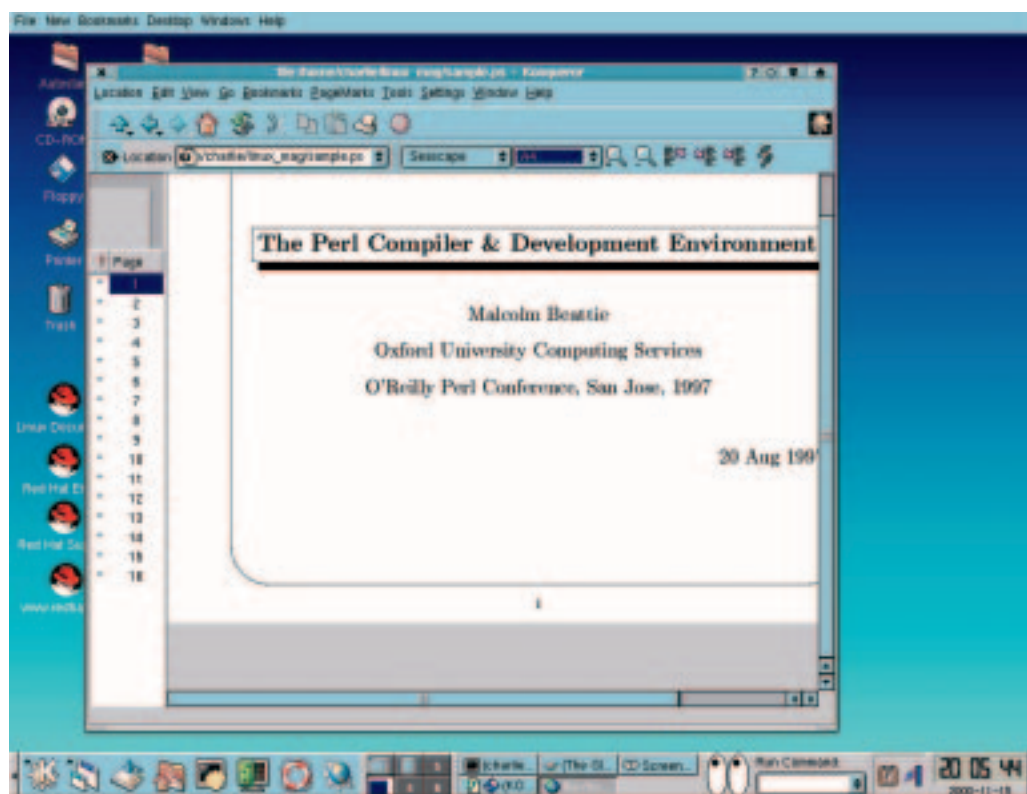
Point Konqueror at a web page and suddenly it's a web browser! Integrated web desktops come to Linux.



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Konqueror can handle plugins to display different types of image; here we see it displaying a Postscript file.



interface, such as VeePee (the Visual Python environment now in development: see <http://www.thekompany.com/projects/vp/> for details). Bindings for C, C++ and Python, as well as experimental Java bindings, are available.

The KIO libraries are designed to get data in and out of KDE programs as efficiently as possible. They're designed to be network transparent and hence can be used to access files locally and over the internet using HTTP (web), FTP, POP, IMAP, NFS, SMB, and LDAP. It's designed to be modular so that developers can plug in extra protocols such as WebDAV, which will then automatically be available to all KDE applications. KIO is also capable of helping applications open files with different mime content-types; if it can identify the mimetype of a file it can call a separate KPart object to open it, embedded within the current application.

KParts is probably the most exciting element of KDE 2.0. Since Apple's abortive OpenDoc technology in the mid-nineties, developers have been looking for a way of replacing the monolithic applications we use today with a document-centred object oriented system. Wouldn't it be nice if, when you insert a table in your word processed report, you had access to the full powers of a spreadsheet for editing it – and vice versa? KParts is a component object model (like ActiveX or OpenDoc) which allows an application to embed another within itself. The model handles all aspects of the embedding, such as positioning toolbars and inserting the proper menus when the embedded component (for example, that spreadsheet in the middle of the word processed report) is activated or deactivated. KParts can also interface with the KIO

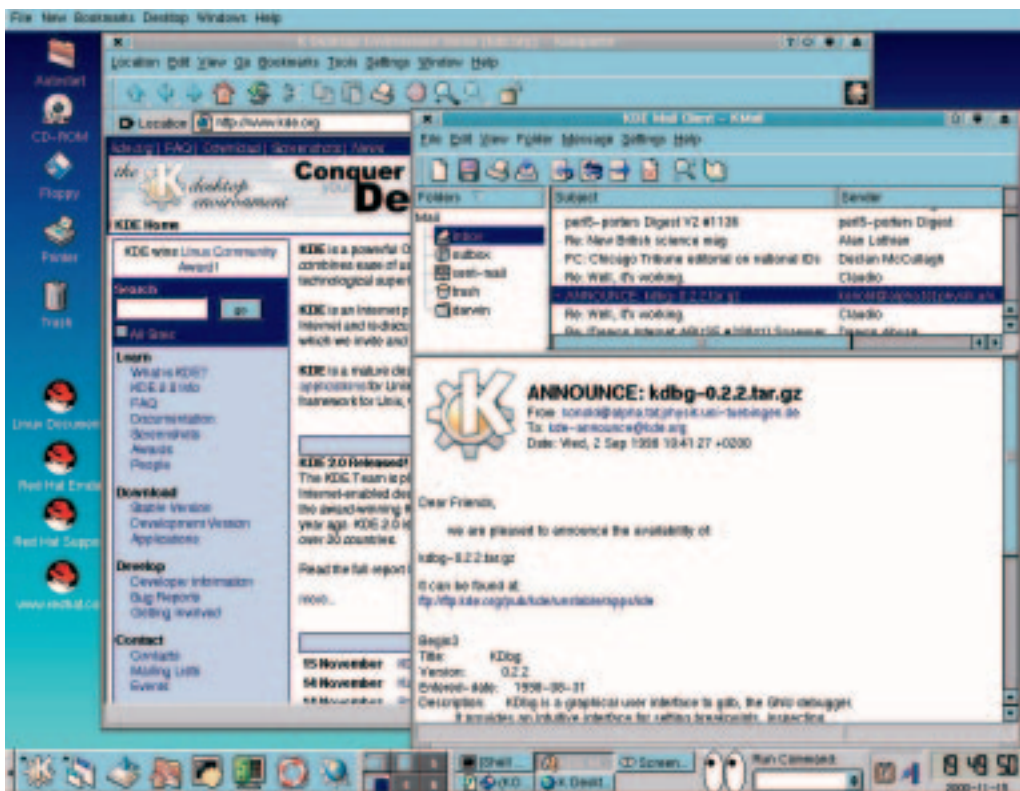
trader to locate available handlers for specific mimetypes or services/protocols: for example, you can insert a Postscript file in a KWord document, and if everything is set up properly the Postscript viewer will show you the file properly as well as enabling it to print.

KHTML is an HTML 4.0 compliant rendering and drawing engine. It supports JavaScript, Java (if you have an external JVM installed on your computer), HTML 4.0, CSS-2 (Cascading Style Sheets), SSL (Secure Socket Layer for secure communications) and Netscape Communicator plugins (if your copy of KDE was built with LessTif – these allow you to view Flash, RealAudio, RealVideo, and other proprietary technologies). KHTML is used by Konqueror and any other application that needs to display HTML.

KDE 2.0 uses XML to create and position menus, toolbars and possibly other aspects of the user interface – an approach pioneered by the Mozilla web browser and now becoming ubiquitous. This in turn makes it easier to configure these user interface elements across applications and achieve compliance with the KDE Standards and Style Guide even if the standards are modified.

Behind the steering wheel

At first sight, KDE 2.0 looks very similar to KDE 1.2 – or indeed to Windows 98. When you first fire it up, it displays the usual splash screen and prints some startup messages then shows you a desktop with a toolbar at the bottom. It'll also pop up an annoying Wizard with some unhelpful hints about using KDE, but you can get him to go away easily enough.



KMail is the standard built-in email client for KDE.

Understanding graphical desktops on Linux

Unix and Linux don't have a built-in graphics system. Instead, Linux runs a piece of software called the X Window System. X (now at version 11, release 6) isn't a graphical user environment like MacOS or Windows – it's a programmer's toolbox for drawing windows and bitmaps on a screen. Raw X11 isn't usable by humans: there are no mice or scroll bars and no way of controlling the user interface. We put up with X11 for three reasons. Firstly, it's the standard UNIX graphics system – it's been around for nearly fifteen years. Secondly, it provides powerful features that other graphical systems don't have: for example, an X application running on one machine can display its user interface on a different machine elsewhere on the network. And thirdly, when we combine X11 with a thing called a Window Manager, we get something we can work with: a window manager and a bunch of other utilities combine to make a desktop environment.

A window manager is an X application that manages windows. It draws pretty borders around them, with scroll bars and the other decorations we take for granted. It supplies menus, it controls what happens when we click the "minimize" button on a window (or any other buttons), and it lets us click on a window and drag it around. (Raw X doesn't even let you drag windows – it isn't configured to do so!) The window manager supplies a "personality" (or set of policies, in X11-speak) for the X window system. It also lets you launch other programs, running under X, and keeps track of where their windows are displayed.

A desktop environment consists of a bunch of programs that, with a window manager, give you a working environment. These tools obey the same set of policies so

that you can transfer data between them, they all behave the same way, and there's an appearance of consistency (which on another operating system would be mandatory). There are tools equivalent to the Windows Explorer that let you navigate among folders, tools to edit or view files, and programs that do everything from browse websites to edit spreadsheets. There's also a toolbar program (equivalent to the Windows Start menu, or a Macintosh's Apple menu) to give rapid access to all these tools, and a control panel application for configuring everything. Unlike Windows or MacOS, Linux doesn't need all this stuff – but it makes life more comfortable.

X application environments differ from Windows or MacOS in one major respect: widget sets. A widget set is a collection of high-level programmer's tools (for example, buttons, window frames, dialog boxes, and menus) that programs are constructed with. Windows and MacOS come with a single core widget set, along with their standard user interface policies. But there's no standard widget set for X. Instead, each window manager uses a different one – and so do X applications. Different widget libraries have different look and feel characteristics; programs using different ones look as if they come from different operating systems. But they all run on X, which is one reason X has been described as the Frankenstein's Monster of graphical user interfaces.

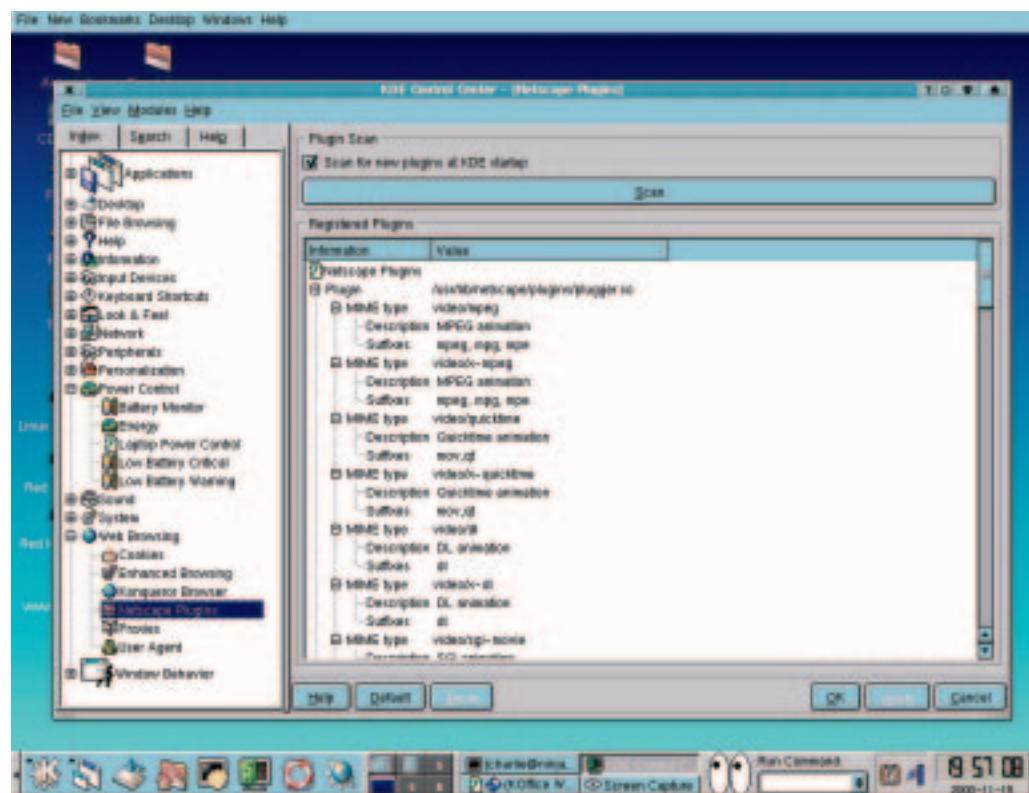
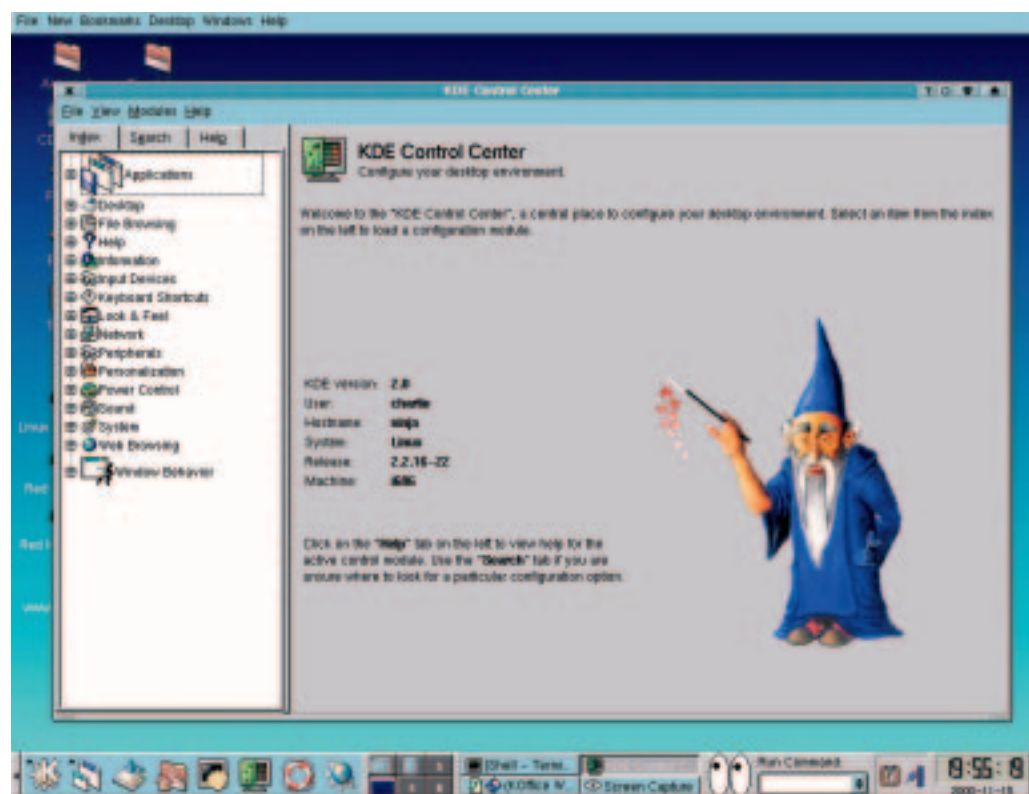
In the late eighties and early nineties, the UNIX world was dominated by a single desktop – CDE, the Common Desktop Environment. CDE used the Motif widget set, and the Motif Window Manager; on top of this platform it added a toolbar and a bunch of extra programs. Unfortunately, Motif was (until very recently) the commercial and expensive property of the X/Open Group, and CDE even more so; this ruled it out for use on cheap Linux systems. In addition, CDE hasn't changed in look and feel since about 1992, and now looks antiquated.

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KDE's Control Centre, shown here, has acquired masses of extra control panels since the last release.

Here are some of the Control Panel options for Konqueror, the integrated web browser – showing how we've allocated Netscape plugins to handle special mime types.



The toolbar is similar to that of GNOME, or any other Linux desktop environment. At the left is the 'K' menu, which does pretty much what you'd expect (it's equivalent to the Windows 'Start' button). To the right of it are icons for a list of current open windows (you can choose which one to bring to the top), a button to show the desktop (by temporarily making any open windows invisible), then buttons to take you to your home

directory, open a console window, run the KDE Control Panel, start up the online help browser, and start the Konqueror web browser. Beyond the buttons lies a set of virtual desktops: unlike Windows (but like all UNIX window managers) KDE lets you maintain a number of desktops which you can flip between by clicking on the pager.

Actually, there are two shortcuts to the Konqueror web browser in the toolbar; the web

button and the home directory button. Konqueror isn't just a web browser: it's a file manager as well. If you click on the home directory icon you'll see a file manager window pop up, giving you an explorer-style display of your home directory. At the top of the window, however, is a location: toolbar – enter a URL and the file manager suddenly turns out to be a fully functional web browser. By default, it shows you a directory navigation window to the left: you can get rid of this via the "Window" menu. And then you're using an integrated desktop web browser, just like Windows 98. There are other nice aspects of Konqueror's integration. Select a URL (web address) in any window then mouse over the web icon in the toolbar and a popup menu will ask if you want to open it with Konqueror, or Netscape: but why you'd want Netscape is a mystery. Konqueror is one of the better style-sheet compatible browsers available on Linux. Konqueror also supports KDE components, including those of KOffice – if you click on a KOffice document in Konqueror (as a file manager) it will load and display

it. It can also load and display Acrobat (PDF) files, postscript files, TeX DVI files, and a number of different KParts components.

The Control Centre icon brings up a very much expanded version of the old KDE Control Centre. KDE 2.0 is almost drowning in features for you to configure. From version 2.0, the underlying Qt library is fully themable; it's possible to reconfigure the look and feel of KDE (and the sounds it makes) extensively. The Power Control panel, to name but one, now has facilities for controlling what your KDE 2.0 laptop will do when the battery runs low; the Network control lets you set up Windows disks and printers to share, and the Information control tells you more about your machine's hardware than you believed possible.

KDE 2.0 comes with the usual surplus of desktop utilities, games, multimedia tools, mp3 players, and so on. But the jewel in KDE's crown is KOffice. Go to the K menu, select the "Office" submenu, and pick the "Office Workspace" option. This fires up a KOffice document window, within

Downloading and installing KDE 2.0

KDE doesn't yet have the same sort of installation wizard as Helix GNOME, although one is promised for later this year (after KDE 2.0 is released). Unless you are running Debian Linux or a server distribution you probably already have KDE 1.1 or 1.2 installed; you'll therefore need to download and compile KDE 2.0.

You can find KDE's main web site at www.kde.org (or a local mirror at www.uk.kde.org). This includes links to mirror sites and the FTP server where files are stored for download. If you have difficulty finding it, point your FTP client or web browser at <ftp://ftp.sunsite.org.uk/Mirrors/ftp.kde.org/pub/kde/stable/>, where the latest stable version is available for download. If you have a current RPM-based distribution such as Red Hat 7 or SuSE 7.0, you'll need to look in the directory `distribution/rpm` for a subdirectory that corresponds to your system. You then download the binary RPM packages, and install them.

You will need to look in the subdirectory `latest/distribution` for the subdirectory best suited to your needs – there are separate directory trees for Caldera, Red Hat, Corel, SuSE, Debian, and others. You can either download binary RPMs (typically with `i386` in their name, for Intel hardware) or Source RPMs (with `.src.rpm` in their filename); the latter will need recompiling to a binary RPM before you can install them.

One point to note is that you need to install more than just the KDE packages to get your desktop. To start with, you need a modern Linux distribution based on Glibc 2.1; this means SuSE 7.0, Red Hat 7, Caldera 2.4 LTP, or Debian Potato. (You can just about get KDE 2.0 to install on an earlier release such as Redhat 6.3, but you'll need to upgrade lots of packages by hand before it will compile.) In addition to the base Qt RPM file you'll need the Qt-devel and Qt-Xt packages. It's also necessary to install the Flex parser generator's 2.5.4 release and lib-mng (used for

animated PNG graphics). Optionally, the Konqueror web browser can use Netscape plug-ins to display special types of data; if you want this to be available you'll need to install either a precompiled set of KDE RPM files or make sure that the development packages for Lesstif, the GNU Motif clone, is installed on your system.

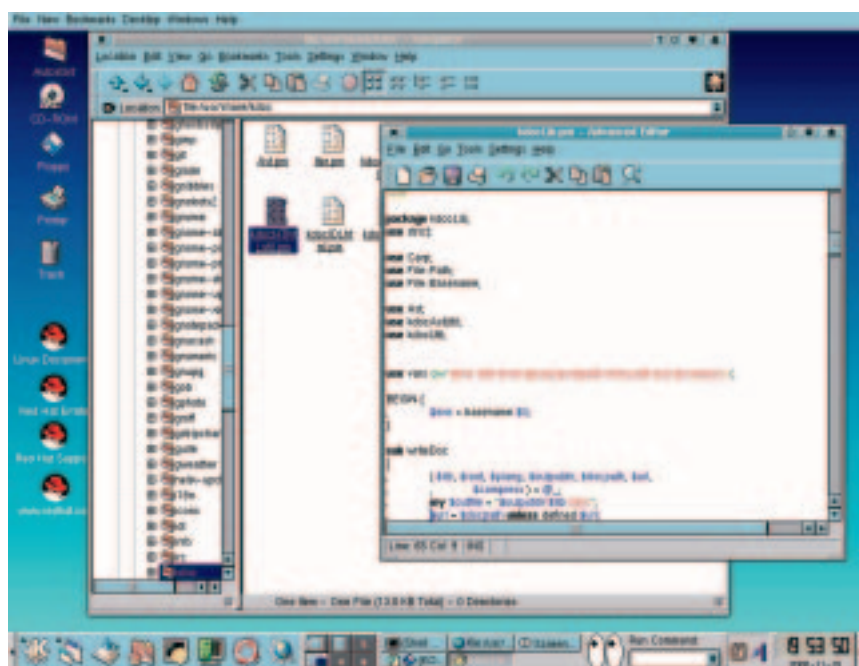
There are detailed explanations of which packages you need, and how to install them, at <http://www.kde.org/documentation/>. (You should read the whole document before getting started – the process is fairly complicated.) In a nutshell, after installing Qt and the ancillary libraries noted above, you should set the environment variable `QTDIR` to wherever Qt is installed (typically somewhere like `/usr/lib/qt-2.1.1`), then install the `Kdesupport` package. After `Kdesupport`, you should install `Kdelibs`. Next, install `Kdebase`, which contains the basic KDE desktop kit. Thereafter, install the rest of the KDE packages in any order – you can omit things like games or graphics or multimedia if you don't want them. You will then want to set the environment variable `KDEDIR` to wherever you've installed KDE 2.0 before you run it for the first time; this is usually set globally in the file `/etc/profile` (or in `/etc/profile.d/kde.sh` if you're running a recent Red Hat release).

To install the binary RPM files, you can use a tool such as `gnorpm` (on Red Hat) or `YaST` (on SuSE) to select the RPM files and install them; alternatively, open a terminal window, become root (using `su`), then type: `rpm -Uh package.rpm`. At this point, the `rpm` tool may warn you of a conflict with files installed by an earlier version of KDE; you can override this by using the `--nodeps` and `--force` options: `rpm -Uh --nodeps --force package.rpm`.

To rebuild KDE from the source RPM files, use `rpm --rebuild package.rpm` to install the RPMs. This unpacks the source code under `/usr/src/redhat/SOURCES` (or `/usr/src/suse/SOURCES`) and recompiles them, then creates binary RPM files in `/usr/src/redhat/RPMS/i386`. You'll need to install these as described above.

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KDE has a fairly powerful text editor as well as the office applications; here we see the Advanced Editor working on some Perl source code, with a view of the directory we're editing

which you can create a variety of types of file – anything, in fact, for which a KPart component is available. Currently this includes word processing files, spreadsheets, equations, charts, diagrams

(using the Kivio diagram tool, which is still in development and isn't part of the stable KDE 2.0 release), and so on. This is KOffice's first public release; a number of features aren't yet ready, such as file import and export filters for KWord. It's also not as stable as it should be, yet: KOffice feels like a beta release. Nevertheless, it's an impressively neat little integrated office application suite.

All of this comes at a price. It's probably a bad idea to try and run KDE 2.0 on a machine with less than 64Mb of RAM and a P166 processor – and the installation takes roughly 100 Mb of disk space. This is not a lightweight, pared-down desktop system. However, it's well on the way to becoming the sort of desktop you could turn an office worker loose on without worries; once it's fully integrated into a mainstream distribution such as SuSE or Redhat, all you need to do is add StarOffice (until KOffice is mature enough for prime time use) and you've got a working office desktop that will integrate well with Windows file servers, provide decent web access (and mail, via KMail, and messaging using the Kit client for AOL Instant Messenger, and a host of other tools), and let them get the daily work done. KDE 2.0 really is a mature desktop environment – don't let anyone tell you otherwise. ■

How to start KDE

There are two ways to start X and a desktop environment on the console of a Linux system. You can start your machine up in text-only mode, log in, then type the command "startx", or you can configure your machine to display a graphical login prompt (using the xdm – X Display Manager – program, or the kdm replacement that comes with KDE).

The mode your machine starts up in – graphical or text-only – is controlled by the init system, a mechanism for controlling startup and shutdown of Linux. (This is configured by the file `/etc/inittab`, and if you open a terminal session and type "man init" you'll get some documentation that explains how this happens.) Most current Linux distributions (including Red Hat, SuSE, Corel, and Caldera) set up X during the installation process and then configure init to start the graphical login system automatically whenever you reboot.

The xdm login system uses configuration files in `/etc/X11/xdm`. You can find documentation on xdm by typing `man xdm` at a shell prompt – be warned, xdm is complex, because in addition to logging in users at the console, it has support for running multiple X sessions, and X sessions running on X terminals (special graphical terminals that allow multiple users to run X on the same server computer at the same time).

Kdm is configured from a single file, typically `/usr/share/config/kdmrc`; this is created by the KDE Control Centre (click on "Login Manager" under "Applications"; you need to be running the Control Centre as root for this to work). If you've configured kdm, you can swap from using xdm to kdm by editing `/etc/inittab` and replacing the line that starts xdm with one that runs `/usr/bin/kdm` (or whatever the path to kdm is) in its place, then tell init to re-read the inittab file (type `init q`).

If your computer is giving you a text-mode login prompt, you can start X11 using the xinit system. Type the command `startx`; this script will then set up various parameters and run xinit, a wrapper that is designed to start up an X session and a window manager.

You can customize the programs that are run when you start up X using xinit by editing a file in your home directory called `.xinitrc`; create this by copying `/etc/X11/xinit/xinitrc`, and edit it. The last thing that the `xinitrc` script does is start a window manager. If you have installed KDE on a previously KDE-free system, you need to replace `exec fvwm` or `exec twm` (or the final failsafe window manager) with `exec startkde` (or whatever the path to the `startkde` script is). `startkde` is a script that comes with KDE and ensures that all the necessary programs – including the window manager – are started up in the right order.