

7.3. The graphical environment

 tldp.org/LDP/intro-linux/html/sect_07_03.html

7.3.1. Introduction

The average user may not care too much about his login settings, but Linux offers a wide variety of flashy window and desktop managers for use under X, the graphical environment. The use and configuration of window managers and desktops is straightforward and may even resemble the standard MS Windows, Apple or UNIX CDE environment, although many Linux users prefer flashier desktops and fancier window managers. We won't discuss the user specific configuration here. Just experiment and read the documentation using the built-in Help functions these managers provide and you will get along fine.

We will, however, take a closer look at the underlying system.

7.3.2. The X Window System

The X Window System is a network-transparent window system which runs on a wide range of computing and graphics machines. X Window System servers run on computers with bitmap displays. The X server distributes user input to and accepts output requests from several client programs through a variety of different interprocess communication channels. Although the most common case is for the client programs to be running on the same machine as the server, clients can be run transparently from other machines (including machines with different architectures and operating systems) as well. We will learn how to do this in [Chapter 10](#) on networking and remote applications.

X supports overlapping hierarchical sub-windows and text and graphics operations, on both monochrome and color displays. The number of X client programs that use the X server is quite large. Some of the programs provided in the core X Consortium distribution include:

- **xterm**: a terminal emulator
- **twm**: a minimalistic window manager
- **xdm**: a display manager
- **xconsole**: a console redirect program
- **bitmap**: a bitmap editor
- **xauth**, **xhost** and **iceauth**: access control programs
- **xset**, **xmodmap** and many others: user preference setting programs
- **xclock**: a clock
- **xlsfonts** and others: a font displayer, utilities for listing information about fonts, windows and displays
- **xfst**: a font server
- ...

We refer again to the man pages of these commands for detailed information. More explanations on available functions can be found in the *Xlib - C language X Interface* manual that comes with your X distribution, the X

Window System Protocol specification, and the various manuals and documentation of X toolkits. The `/usr/share/doc` directory contains references to these documents and many others.

Many other utilities, window managers, games, toolkits and gadgets are included as user-contributed software in the X Consortium distribution, or are available using anonymous FTP on the Internet. Good places to start are <http://www.x.org> and <http://www.xfree.org>.

Furthermore, all your graphical applications, such as your browser, your E-mail program, your image viewing programs, sound playing tools and so on, are all clients to your X server. Note that in normal operation, that is in graphical mode, X clients and the X server on Linux run on the same machine.

7.3.2.1. Display names

From the user's perspective, every X server has a *display name* in the form of:

hostname:displaynumber.screennumber

This information is used by the application to determine how it should connect to the X server and which screen it should use by default (on displays with multiple monitors):

- *hostname*: The host name specifies the name of the client machine to which the display is physically connected. If the host name is not given, the most efficient way of communicating to a server on the same machine will be used.
- *displaynumber*: The phrase "display" is usually used to refer to a collection of monitors that share a common key board and pointer (mouse, tablet, etc.). Most workstations tend to only have one keyboard, and therefore, only one display. Larger, multi-user systems, however, frequently have several displays so that more than one person can be doing graphics work at once. To avoid confusion, each display on a machine is assigned a *display number* (beginning at 0) when the X server for that display is started. The display number must always be given in a display name.
- *screen number*: Some displays share a single keyboard and pointer among two or more monitors. Since each monitor has its own set of windows, each screen is assigned a *screen number* (beginning at 0) when the X server for that display is started. If the screen number is not given, screen 0 will be used.

On POSIX systems, the default display name is stored in your `DISPLAY` environment variable. This variable is set automatically by the **xterm** terminal emulator. However, when you log into another machine on a network, you might need to set `DISPLAY` by hand to point to your display, see [Section 10.4.3.2](#).

More information can be found in the X man pages.

7.3.2.2. Window and desktop managers

The layout of windows on the screen is controlled by special programs called *window managers*. Although many window managers will honor geometry specifications as given, others may choose to ignore them (requiring the user to explicitly draw the window's region on the screen with the pointer, for example).

Since window managers are regular (albeit complex) client programs, a variety of different user interfaces can be built. The X Consortium distribution comes with a window manager named **twm**, but most users prefer something more fancy when system resources permit. Sawfish and Enlightenment are popular examples which allow each user to have a desktop according to mood and style.

A desktop manager makes use of one window manager or another for arranging your graphical desktop in a

convenient way, with menubars, drop-down menus, informative messages, a clock, a program manager, a file manager and so on. Among the most popular desktop managers are Gnome and KDE, which both run on almost any Linux distribution and many other UNIX systems.

① KDE applications in Gnome/Gnome applications in KDE

You don't need to start your desktop in KDE in order to be able to run KDE applications. If you have the KDE libraries installed (the `kdelibs` package), you can run these applications from the Gnome menus or start them from a Gnome terminal.

Running Gnome applications in a KDE environment is a bit more tricky, because there is no single set of base-libraries in Gnome. However, the dependencies and thus extra packages you might have to install will become clear when running or installing such an application.

7.3.3. X server configuration

The X distribution that used to come with Linux, *XFree86*, uses the configuration file `XF86Config` for its initial setup. This file configures your video card and is searched for in a number of locations, although it is usually in `/etc/X11`.

If you see that the file `/etc/X11/XF86Config` is present on your system, a full description can be found in the `Info` or `man` pages about `XF86Config`.

Because of licensing issues with XFree86, newer systems usually come with the *X.Org* distribution of the X server and tools. The main configuration file here is `xorg.conf`, usually also in `/etc/X11`. The file consists of a number of sections that may occur in any order. The sections contain information about your monitor, your video adaptor, the screen configuration, your keyboard etcetera. As a user, you needn't worry too much about what is in this file, since everything is normally determined at the time the system is installed.

Should you need to change graphical server settings, however, you can run the configuration tools or edit the configuration files that set up the infrastructure to use the XFree86 server. See the man pages for more information; your distribution might have its own tools. Since misconfiguration may result in unreadable garbage in graphical mode, you may want to make a backup copy of the configuration file before attempting to change it, just to be on the safe side.