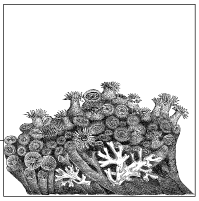
3

Retrieving the Kernel Source



When you're building your own kernel, you want the latest stable release. Many distributions provide their own packages of kernel sources, but these are rarely the most cutting-edge, recent versions. The distribution packages have the advantage of being built to be compatible with the compiler and other tools provided by the distribution (Chapter 2 explains the importance of their being compatible) but they may not end up providing the functionality or performance you want. If you can create your own environment with the latest kernel, compiler, and other tools, you will be able to build exactly what you want. This chapter focuses on determining which kernel sources to download, and how to obtain them.

What Tree to Use

In the past, the Linux kernel was split into only two trees, the "development" branch and the "stable" branch. The *development branch* was denoted by an odd number for the second release number, while the *stable branch* used even numbers. So, as an example, the 2.5.25 release was a development kernel, while the 2.4.25 release is a stable release.

But after the 2.6 series was created, the kernel developers decided to abandon this method of having two separate trees, and declared that all 2.6 kernel releases would be considered "stable," no matter how quickly development was happening. The few months between the major 2.6 releases would allow kernel developers the time to add new features and then stabilize them in time for the next release. Combined with this, a "-stable" kernel branch has been created that releases bug fixes and security updates for the past kernel release, before the next major 2.6 release happens.

This is all best explained with some examples, illustrated in Figure 3-1. The kernel team released the 2.6.17 kernel as a stable release. Then the developers started working on new features and started releasing the *-rc* versions as development kernels so that people could help test and debug the changes. After everyone agreed that the development release was stable enough, it was released as the 2.6.18 kernel. This whole cycle usually takes about two to three months, depending on a variety of factors.

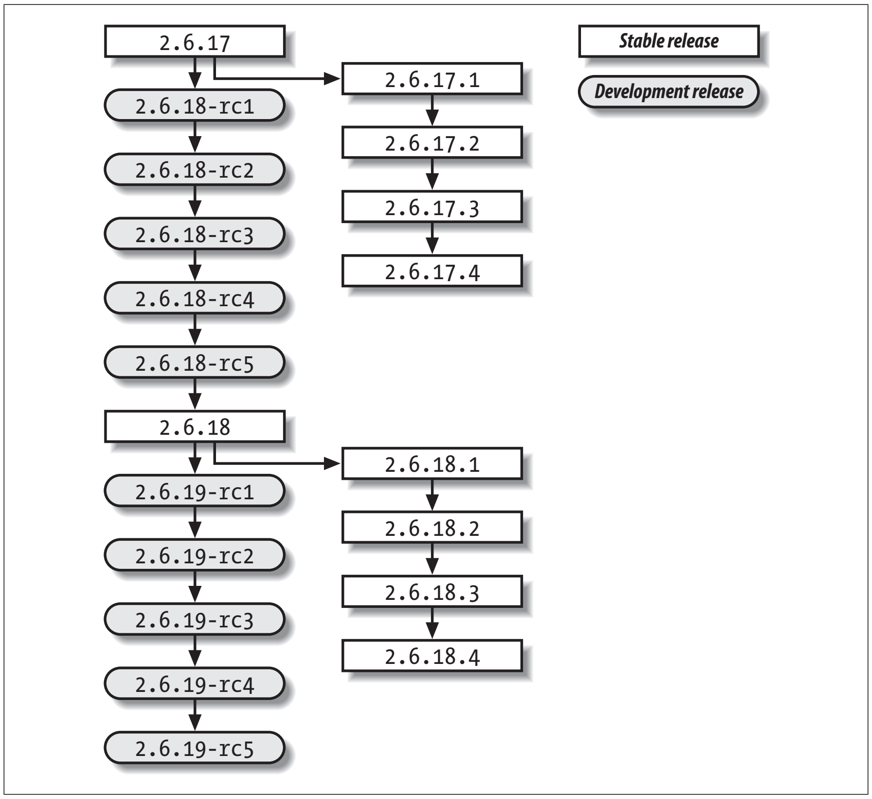


Figure 3-1. Kernel development release cycle

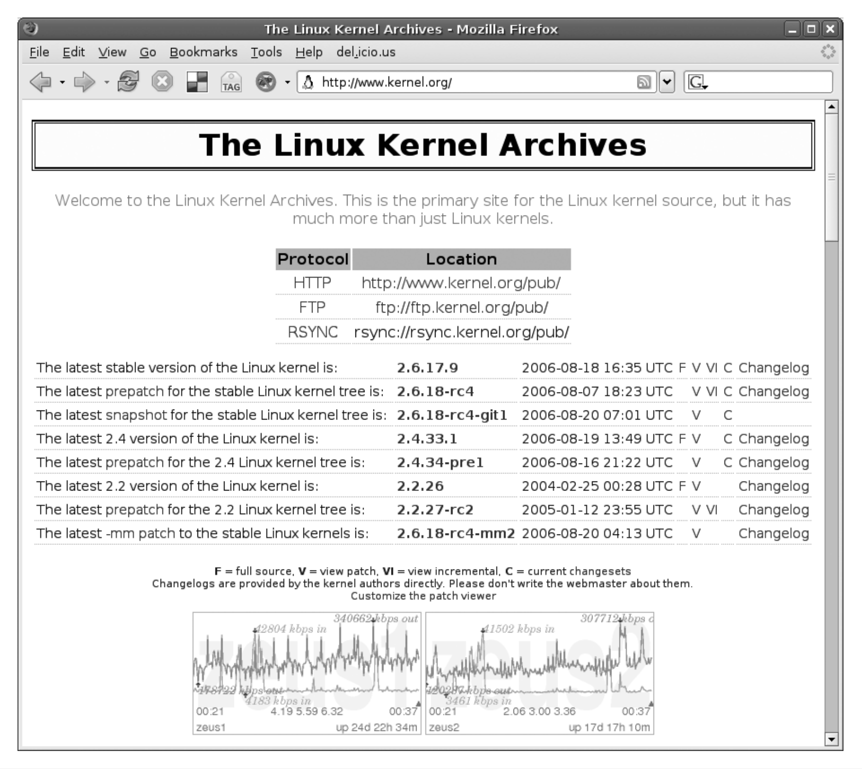
While the development of the new features was happening, the 2.6.17.1, 2.6.17.2, and other stable kernel versions were released, containing bug fixes and security updates.

If you wish to just use the latest kernel for your work, it is recommended that you use the stable kernel releases. If you wish to help the kernel developers test the features of the next kernel release and give them feedback, use the development kernel release. For the purpose of this chapter, we will assume that you are using a stable kernel release.

Where to Find the Kernel Source

All of the source code for the Linux kernel can be found on one of the *kernel.org* sites, a worldwide network of servers that mirror the Linux source code, enabling anyone to find a local server close to him. This allows the main kernel servers to be responsive to the mirror sites, and lets users download the needed files as quickly as possible.

The main *http://www.kernel.org* site shows all of the current kernel versions for the various different kernel trees, as shown in Figure 3-2.



The Linux Kernel Archives

Welcome to the Linux Kernel Archives. This is the primary site for the Linux kernel source, but it has much more than just Linux kernels.

Protocol	Location
HTTP	http://www.kernel.org/pub/
FTP	ftp://ftp.kernel.org/pub/
RSYNC	rsync://rsync.kernel.org/pub/

The latest stable version of the Linux kernel is:	**2.6.17.9**	2006-08-18 16:35 UTC	F	V	VI	C	Changelog
The latest prepatch for the stable Linux kernel tree is:	**2.6.18-rc4**	2006-08-07 18:23 UTC		V	VI	C	Changelog
The latest snapshot for the stable Linux kernel tree is:	**2.6.18-rc4-git1**	2006-08-20 07:01 UTC		V		C	
The latest 2.4 version of the Linux kernel is:	**2.4.33.1**	2006-08-19 13:49 UTC	F	V		C	Changelog
The latest prepatch for the 2.4 Linux kernel tree is:	**2.4.34-pre1**	2006-08-16 21:22 UTC		V		C	Changelog
The latest 2.2 version of the Linux kernel is:	**2.2.26**	2004-02-25 00:28 UTC	F	V			Changelog
The latest prepatch for the 2.2 Linux kernel tree is:	**2.2.27-rc2**	2005-01-12 23:55 UTC		V	VI		Changelog
The latest -mm patch to the stable Linux kernels is:	**2.6.18-rc4-mm2**	2006-08-20 04:13 UTC		V			Changelog

F = full source, **V** = view patch, **VI** = view incremental, **C** = current changesets
Changelogs are provided by the kernel authors directly. Please don't write the webmaster about them.
Customize the patch viewer

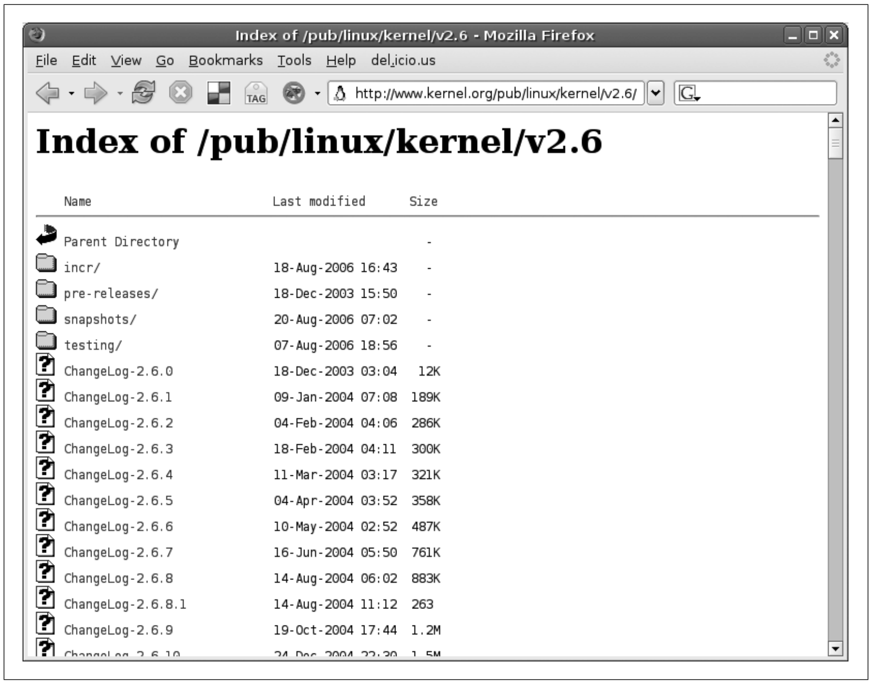
Figure 3-2. The main kernel.org web site

To download the latest stable kernel version, click on the *F* character on the line for the kernel version. This will download the full source tree. Or you can navigate to the proper subdirectory for all of the 2.6 kernel versions, *http://www.us.kernel.org/pub/linux/kernel/v2.6/*, shown in Figure 3-3.

It is also possible to download the kernel source from the command line, using the *wget* or *curl* utilities, both of which should come with your Linux distribution.

To download the 2.6.17.8 kernel version using *wget*, enter:

```
$ wget http://www.kernel.org/pub/linux/kernel/v2.6/linux-2.6.17.8.tar.gz
--17:44:55--  http://www.kernel.org/pub/linux/kernel/v2.6/linux-2.6.17.8.
tar.gz
           => `linux-2.6.17.8.tar.gz'
Resolving www.kernel.org... 204.152.191.5, 204.152.191.37
Connecting to www.kernel.org|204.152.191.5|:80... connected.
HTTP request sent, awaiting response... 200 OK
```


Index of /pub/linux/kernel/v2.6 - Mozilla Firefox
File Edit View Go Bookmarks Tools Help del.icio.us
TAG
http://www.kernel.org/pub/linux/kernel/v2.6/

Index of /pub/linux/kernel/v2.6

Name	Last modified	Size
Parent Directory		-
incr/	18-Aug-2006 16:43	-
pre-releases/	18-Dec-2003 15:50	-
snapshots/	20-Aug-2006 07:02	-
testing/	07-Aug-2006 18:56	-
ChangeLog-2.6.0	18-Dec-2003 03:04	12K
ChangeLog-2.6.1	09-Jan-2004 07:08	189K
ChangeLog-2.6.2	04-Feb-2004 04:06	286K
ChangeLog-2.6.3	18-Feb-2004 04:11	300K
ChangeLog-2.6.4	11-Mar-2004 03:17	321K
ChangeLog-2.6.5	04-Apr-2004 03:52	358K
ChangeLog-2.6.6	10-May-2004 02:52	487K
ChangeLog-2.6.7	16-Jun-2004 05:50	761K
ChangeLog-2.6.8	14-Aug-2004 06:02	883K
ChangeLog-2.6.8.1	14-Aug-2004 11:12	263
ChangeLog-2.6.9	19-Oct-2004 17:44	1.2M
ChangeLog-2.6.10	24-Dec-2004 22:30	1.5M

Figure 3-3. The 2.6 kernel source directory

```
Length: 51,707,742 (49M) [application/x-gzip]
100%[==========================================>] 51,707,742   35.25K/s
ETA 00:00
18:02:48 (47.12 KB/s) - `linux-2.6.17.8.tar.gz' saved [51707742/51707742]
```

To download it using *curl*:

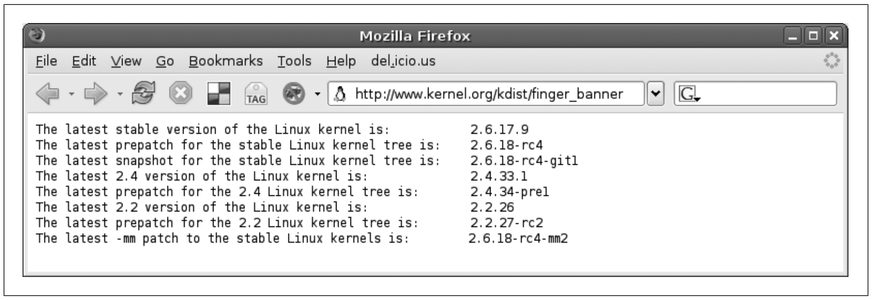
```
$ curl http://www.kernel.org/pub/linux/kernel/v2.6/linux-2.6.17.8.tar.gz \
-o linux-2.6.17.8.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time
Current
                                 Dload  Upload   Total   Spent    Left
Speed
100 49.3M  100 49.3M    0     0  50298      0  0:17:08  0:17:08 --:--:--
100k
```

For a quick and easy way to determine the latest kernel versions, use the information available at *http://www.kernel.org/kdist/finger_banner*, illustrated by Figure 3-4.

What to Do with the Source

Now that you have downloaded the proper kernel source, where is it supposed to go? We suggest creating a local directory in your home directory called *linux* to hold all of the different kernel source files:

```
$ mkdir ~/linux
```



http://www.kernel.org/kdist/finger_banner

```
The latest stable version of the Linux kernel is:           2.6.17.9
The latest prepatch for the stable Linux kernel tree is:    2.6.18-rc4
The latest snapshot for the stable Linux kernel tree is:    2.6.18-rc4-git1
The latest 2.4 version of the Linux kernel is:              2.4.33.1
The latest prepatch for the 2.4 Linux kernel tree is:       2.4.34-pre1
The latest 2.2 version of the Linux kernel is:              2.2.26
The latest prepatch for the 2.2 Linux kernel tree is:       2.2.27-rc2
The latest -mm patch to the stable Linux kernels is:       2.6.18-rc4-mm2
```

Figure 3-4. Latest kernel version

Now move the source code into this directory:

```
$ mv ~/linux-2.6.17.8.tar.gz ~/linux/
```

And go into the *linux* directory:

```
$ cd ~/linux
$ ls
linux-2.6.17.8.tar.gz
```

Now that the source code is in the proper directory, uncompress the tree:

```
$ tar -xzvf linux-2.6.17.8.tar.gz
```

The screen will be filled with files that are uncompressed, and you will be left with the following in the *linux/* directory:

```
$ ls
linux-2.6.17.8.tar.gz
linux-2.6.17.8/
```