DVD burning programs under Linux

Flint and Tinder

No matter whether you have DVD-R(W), DVD+R(W), or DVD-RAM media, the quickest way to burn a Linux data DVD from an image, or with your weekly hard disc backup, is the command line. BY MIRKO DÖLLE

No matter what you want to put on your DVD, it will not involve a great deal of installation effort. Of course you will need to equip your PC with a DVD burning device, if you do not already have one. And ensure that the drive supports the formats you require, as the manufacturers have so far been unable to agree on a standard.

Three distinct DVD media families have evolved so far: DVD-R(W), DVD + R(W) and DVD-RAM. Some new drives support multiple formats. DVD-R and DVD + R devices will also burn CD media. Linux can handle any of these formats, although you do need a different configuration depending on the type.

SCSI or IDE

Attaching a SCSI burning device to a SCSI controller that you set up previously should be quite simple. The controller and the devices attached to it – assuming that the bus is wired and terminated correctly – should be visible to and useable by any Linux distribution.

Setting up an IDE burning device does involve a few additional settings, although your distribution's hardware recognition feature may take care of that automatically. As CD or DVD burning devices are controlled by SCSI commands, you have to fool the operating system into thinking that the IDE device is a SCSI device. This IDE/SCSI emulation is a kernel feature of most modern distributions, although the boot loader configuration file, for example, */etc/lilo.conf* will need to be modified. Use an editor to append a line such as the following to the file,

```
append = "hdd=ide-scsi"
```

taking care to replace *hdd* with the internal IDE descriptor for your burning device (in our example, the drive is attached as a slave to the secondary IDE port). Then reboot to apply the changes.

Media Types

DVD-RAM media do not need special drivers. If your drive can handle this kind of media, you can access the medium just like a normal floppy. For example, *mke2fs /dev/scd0* will format the DVD-RAM medium in your first DVD burning device. You can then enter *mount /dev/scd0 /mnt* to mount the medium, and use the command line (or a file manager) to copy data onto the medium, just like any other hard or floppy disk. Before removing the medium, make sure that you unmount the DVD-RAM to allow any data in the buffer to be written out to the DVD. Sadly, not all drives can read DVD-RAMs.

Special programs are required to write data and videos on DVD media. Many distributions include the dvdrecord package (dvdrtools [1]), and support DVD-R(W) drives. The program is actually a re-worked version of cdrtools.

Growisofs, one of the dvd + rwtools, is an alternative to dvdrecord and capable of writing a whole range of formats; DVD-R, DVD-RW, DVD + R, and DVD + RW. But growisofs' handling is completely different from that of dvdrecord [2].

Commercial Programs

If this is too confusing for you, you might prefer cdrecord-ProDVD, an en-

GLOSSARY

DVD-R and DVD-RW: The DVD-R standard specifies write-once media, the DVD counterpart of the CD-R. Most drives support DVD-R. Just like CD-RWs soon appeared to supplement CD-Rs, it was not long until write-many DVD-RWs became available.

DVD+R and DVD+RW: The DVD burning device issue soon split the manufacturers' camp. While the DVD-R format was adopted as the de-facto standard, another group of manufacturers decided to launch its own format. But neither of these camps has been able to capture the market completely. This means that there is a second DVD standard, DVD+R(W).

DVD-RAM: This format supports capacities of up to 4.8 GB and up to 100,000 write operations in theory (DVD+/-RW supports up to 1,000 write ops). DVD-RAM does not require additional drivers or tools on Linux. On the downside, the DVD-RAM media are more expensive.

SCSI: The Small Computer Systems Interface is a bus that transfers data between attached devices and the SCSI controller card. As the bus can be extended outside the computer case, this provides the flexibility to attach up to 15 internal or external devices. There are some differences between the various SCSI types. SCSI 2, Fast SCSI, Ultra SCSI, Wide SCSI, Ultra Wide SCSI, and Ultra2Wide SCSI.

IDE: Integrated Drive Electronics is not a bus, but an interface that can support a maximum of two devices. The controller evaluates the jumper position to distinguish between the two devices, assigning the master role to one, and the slave role to the other. EIDE means Enhanced IDE and removes the older 504 MB limit for attached drives. ATA is an extension of the EIDE standard. IDE interfaces are identified by their data transfer speeds: UDMA/33, UDMA/66, UDMA/100, and UDMA/133, where the figures indicate the maximum transfer rate in MB/s.

hanced, commercial variant of cdrecord that supports DVD-R/W and DVD + R/W. The license is free for private use [3]. Pre-compiled packages are available for a number of platforms.

If you intend to burn DVD media, you will need to install the dvd + rw-tools, dvdrtools (dvdrecord) or cdrecord-ProDVD package, depending on your drive. RPM packages for your distribution are available from the Rpmseek site [4], and some distributions include the package by default.

dvdrecord / cdrecord-ProDVD

Using dvdrecord and cdrecord-ProDVD is identical to using cdrecord, so we will only be looking at one example in this article. All three burning programs assign a SCSI ID to the drive using the 0,0,0 or 0,1,0 format. The following command

```
cdrecord --scanbus
```

outputs a list of SCSI devices, where the first column contains the SCSI ID. In Figure 1, 0,0,0 and 1,0,0 are both burning devices. The following example copies a DVD from the first SCSI drive on the first (virtual) controller:

```
readcd dev=0,0,0 f=image
dvdrecord speed=2 dev=0,0,0 -v image
```

The first line reads the inserted DVD, and stores its contents in an image file. The second line burns this image at dual-speed. However, this approach is restricted to copying DVDs with a maximum capacity of 4482 MB. In addition to this, DVD-R drives are also useful for creating backups. The following command creates an image of the current directory with subdirectories:

```
mkisofs -r -J -o /tmp/image .
```

A similar command to our last example will burn the image:

```
dvdrecord speed=2 dev=0,0,0 -v /tmp/image
```

The limit for images is again 4482 MB. Older systems cannot handle files that exceed 2 GBytes; the command

```
mkisofs -r -J -split -o /tmp/image .
```

will split your directory tree into 1 GB images that dvdrecord recognizes as a group of image files, storing them accordingly on the DVD medium.

DVD-RW

dvdrecord can also handle rewritable DVD-RW media (cdrecord-ProDVD also burns DVD + R and DVD + RW).

```
dvdrecord -v speed=2 dev=0,0,0 blank=fast
```

performs a quick format, while

```
dvdrecord -v speed=2 dev=0,0,0 blank=all
```

erases the medium. The write operation is identical for DVD-RW and DVD-R.

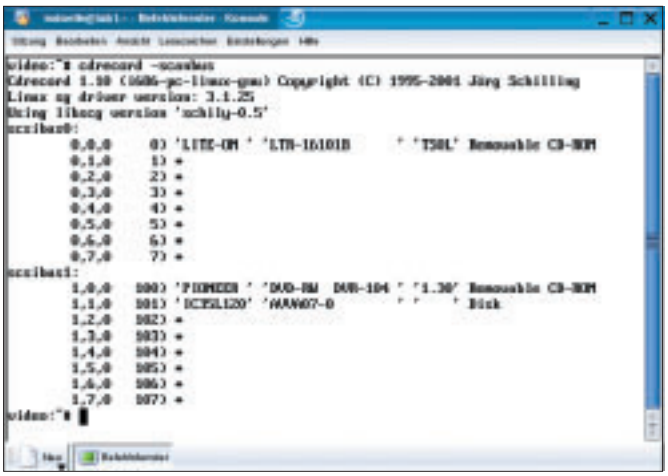

Figure 1: The cdrecord -scanbus command lists the devices attached to the SCSI subsystem; in our example, the numbers 0,0,0 and 1,0,0 point to burning devices

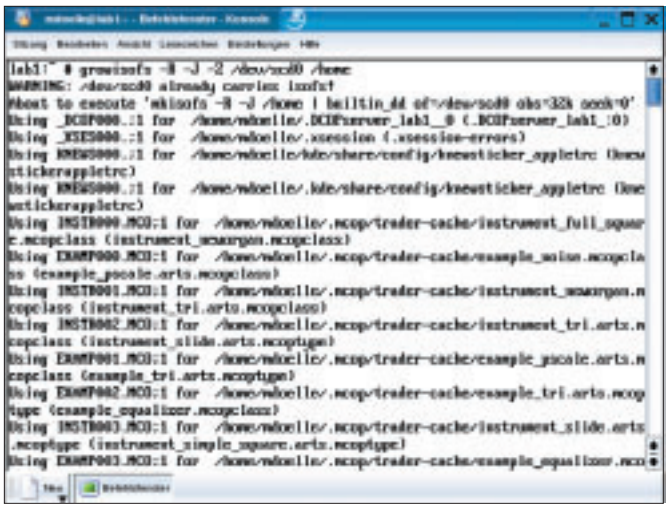

Figure 2: DVD backups, of the users' home directories in our example, are easy to create using growisofs

Differences

By default, and as previously mentioned, dvdrecord has the same options and features as cdrecord and its commercial offshoot cdrecord-ProDVD. The manpage also describes options similar to those of cdrecord; and that is a good thing, as you can use dvdrecord to burn CDs.

But hands-on tests revealed one or two rough edges. You can launch a (non-standard) multi-session mode burning process for a data DVD-R, but this operation will abort without returning a meaningful error message. The only burning mode that dvdrecord supports for DVD media is the DAO (disc at once) format, and you can't use the *--overburn* option. In contrast to this, other options, such as auto-ejecting DVDs after completing the burning operation, work fine.

The commercial cdrecord-ProDVD package does not have any of these weaknesses. It is a more mature program altogether; and it supports both Minus and Plus formats, that is, it works fine with practically any combination of DVD burning devices and media.

growisofs

The fact that dvdrecord is restricted to DVD-R(W), means that you will need the dvd+rw-tools package to support DVD+R(W) drives, if you want to use Open Source only software.

As the Plus tools introduced Minus burning device support in version 5.14, growisofs has now started to outstrip dvdrecord. Pre-compiled RPM packages for various distributions are available from [4]; you can use your package manager to install the appropriate package. But if you prefer to compile the sources, simply download the source archive from the homepage and use make and make install to compile and install.

The installed package provides a number of command line functions that allow you to write DVD+Rs; the backup function being one of the more interesting. A simple command will create a DVD image of a filesystem tree and store it on a DVD+R medium:

```
growisofs -R -J -Z /dev/scd0➥
 /home
```

In this and the following examples, make sure that you point to the SCSI device file for your DVD drive. */proc/scsi/scsi* should provide the information you need. The first SCSI drive in this file will be */dev/scd0*, the second */dev/scd1* and so on.

You can use a slightly different command to write additional files to the same medium: *growisofs -R -J -M /dev/scd0 /data* (-M instead of -Z). And the following command will burn an existing DVD image

```
growisofs -Z /dev/scd0=image.iso
```

Erasing DVD+RW

Rewritable DVD+RW media are easy to handle. Both used and new media have to be formatted first:

```
dvd+rw-format -f /dev/scd0
```

Closing the DVD session makes it easier for other computers and drives to then read the media. The *-lead-out* option takes care of this. Let's look at an example:

```
dvd+rw-format -lead-out /dev➥
/scd0
```

Conclusion

It is typically quite easy to create simple data DVDs on Linux. *cdrecord-ProDVD* and *growisofs* support almost any burning device and media types. Unfortunately, complex DVD mastering is still more or less unsupported under Linux.

After setting up the command line-based burning process, you can of course opt for a GUI-front-end, such as X-CD-Roast [5] or K3b [6]. ■

INFO

[1] DVD-R tools with dvdrecord: *http://www.nongnu.org/dvdrtools/*

[2] DVD+RW tools with growisofs and dvd+rw format: *http://fy.chalmers.se/~appro/linux/DVD+RW/*

[3] CD-Record and CD-Record-ProDVD: *http://www.fokus.gmd.de/research/cc/glone/employees/joerg.schilling/private/cdrecord.html*

[4] RPM search engine: *http://www.rpmseek.com/*

[5] X-CD-Roast project homepage: *http://www.xcdroast.org/*

[6] K3b project homepage: *http://www.k3b.org/*