

Overview of Damn Small Linux

The Damn Small Linux mantra is *small is beautiful*.

Weighing in at about 50MB, Damn Small Linux (DSL) is a fully functional, mini-live CD desktop operating system. Despite its size, DSL can do just about everything you would expect from a modern desktop system, such as browse the web, send and receive email, write documents, manage files, play music, work with spread sheets, and manipulate images.

Many operating systems offering similar software features require a mountain of expensive computer hardware to run well and are burdened with slow, bloated applications. Damn Small Linux takes a different tack.

Unlike what you get with other computer systems, applications packaged with DSL are chosen for their size, speed, and efficient features. Even on low-powered hardware, applications in DSL are startlingly fast and surprisingly powerful. Despite its size, DSL runs faster and more efficiently than many desktop operating systems for the most important things you need a desktop operating system to do.

The book you are holding in your hand is *The Official Damn Small Linux Book*. We say official because the authors of this book include the two key developers of DSL: John Andrews, the creator of Damn Small Linux, and Robert Shingledecker, the lead developer for many of the technical innovations in DSL.

Although this book will step you through the components you can use in DSL, it will also take you much further. You will learn how to install and run DSL from different devices, save your data across reboots, and add applications to DSL to meet your needs. Later, the book will walk you through how to build projects with DSL, such as a music server, Internet telephone service, and portable web server.

MEASURING DAMN SMALL LINUX SUCCESS

Despite its small size, Damn Small Linux has consistently ranked among the most popular Linux distributions. According to rankings from various websites that monitor Linux sites, DSL has consistently been among the most active. According to Google, there are nearly 1,000,000 references to Damn Small Linux on the web. Yahoo indicates the existence of about 1,480,000 inbound links to the Damn Small Linux home page.

At Distrowatch (www.distrowatch.com) for the past three years, DSL has consistently ranked in the top ten Linux distributions for page hits, often ranking among well-known Linux systems such as Debian, Slackware, KNOPPIX, and Gentoo. According to Alexa (www.alexa.com), which monitors website popularity, in early 2007, the DSL website (www.damnsmalllinux.org) was around 33,350 in popularity on the web. That number made it more popular than home websites for Ubuntu, SuSE, Slackware, KNOPPIX, Mepis, Morphix, and other Linux distributions.

As for media coverage, dozens of articles and reviews have been written about Damn Small Linux. In May, 2004, DSL was highlighted on TechTV's *The Screen Savers* show. A DSL CD has been included with magazines such as *Linux Format*, *Linux User & Developer*, *Sys Admin*, *Linux Journal*, *PC Magazine*, *PC World*, *Computer Power User (CPU)*, and *Linux Pro*.

Although Damn Small Linux was not the first Linux live CD (in fact, it was originally based on the KNOPPIX live CD), there are many *firsts* to its credit. DSL was the first Linux live CD distribution to do the following:

- Offer backup and restore capabilities.
- Use download scripts to add software while it was running (in ramdisk).
- Employ extendable software modules that could be used from live CD or disk.
- Integrate USB install scripts.
- Run virtually on Windows desktops using a special embedded version of DSL that includes Qemu virtualization software.
- Offer low-RAM extensions designed to run on live CDs or USB drives.

DSL also included many *firsts* specifically associated with desktop-oriented live CDs. It was the first desktop-oriented live CD to fit on a bootable business card, offering the smallest footprint of any desktop operating system. It also was the first to use the Tiny X Kdrive server as the desktop's X display server. To implement many standard Linux utilities, DSL was the first to use the BusyBox space-saving utility.

Although the features just mentioned help gauge the success of DSL, the best way to measure DSL's value to you is to try it out for yourself.

UNDERSTANDING WHAT DAMN SMALL LINUX DOES BEST

When you boot up Damn Small Linux, the first thing you see is a boot screen. In most cases, you can press Enter and after a few moments, a desktop system appears. With a few clicks, you could be browsing the web, editing documents, playing music, or doing dozens of other activities. Figure 1-1 shows an example of a busy DSL desktop.

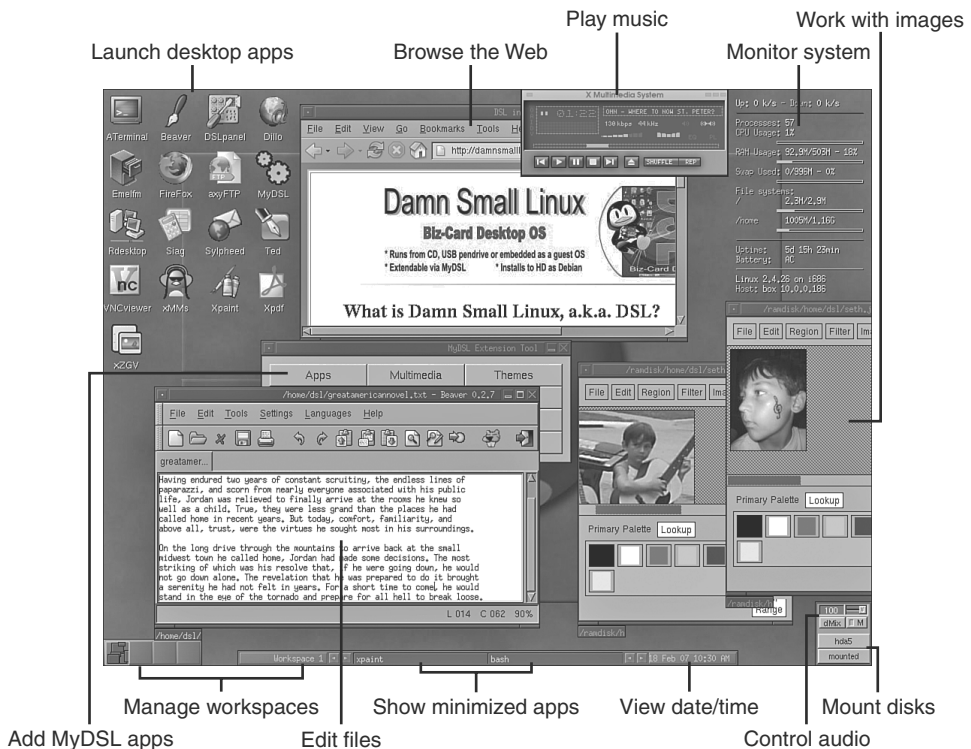


FIGURE 1-1 Damn Small Linux offers a sleek and efficient desktop interface.

The DSL desktop in Figure 1-1 shows some of the basic features of the DSL desktop, along with a few applications. You can launch applications (by a single left mouse click) from the icons shown in the upper-left corner of the screen. In the upper-right corner, view data about system resources (CPU, processes, file system, etc.). The docked.lua tool (lower-right corner) lets you adjust audio and mount disk

partitions. The bottom panel displays the current date/time, minimized applications, and a tool for managing workspaces. Use the tool in the lower left to move applications among workspaces.

The applications shown running in Figure 1-1 include the Firefox web browser, XMMS music player, XPaint image editor, and Beaver text editor. In the upper-right corner is the excellent torsmo system monitor, for watching all your system resources (processor, RAM, swap, disk, and other resource usage). These and other applications that are available natively in DSL are described in detail in Chapter 3, “Using DSL Applications.”

One administrative tool displayed in Figure 1-1 is the MyDSL Extension tool. You can use that tool to download and install applications that are prepackaged to run in DSL (see Chapter 5, “Extending Applications with MyDSL”).

Although the applications shown in the DSL desktop in Figure 1-1 are packaged with the basic 50MB bootable image DSL, the value of Damn Small Linux doesn’t end there. If DSL doesn’t do exactly what you want it to do (and where you want to do it), the project helps you improve on what you can do with DSL in the following ways:

- **It’s expandable**—Using the MyDSL feature and a connection to the Internet, tons of extra applications can be downloaded and installed on your running DSL system with just a couple of mouse clicks. Because DSL has its roots in other popular Linux distributions (in particular, Debian and KNOPPIX), software created for those distributions can often also just be dropped in and run in DSL. See Appendix B, “MyDSL Extensions.”
- **It’s portable**—Although the standard DSL is made to run on a medium as small as a 50MB bootable business card, it can be easily made to run from your hard disk, standard CD or DVD, USB pen drive, or other fixed and removable media. It can even run embedded from installed Linux or Microsoft Windows systems.

Many people have put DSL on a USB pen drive, along with other applications and data (documents, music, images, and presentations). So instead of carrying a whole laptop with you, you can carry everything you need on a USB flashdrive or pen drive that’s about the size of a stick of gum.

Keeping the basic DSL system small, fast, and efficient makes it both a neat tool in itself and a great foundation to build on. Here is a list of some of the best reasons for using DSL:

- **Old machines get new life**—DSL can run on computers with as little as 16MB of RAM and a 486DX processor. DSL developers offer versions of DSL

that boot on older machines that need a smaller boot image (using Syslinux). As a result, the PC gathering dust in the closet can find new life as a simple desktop system, or by adding some extra software, a firewall, web server, or music player PC.

- **Fits in small places**—Damn Small Linux fits on a bootable business card CD. So carrying around DSL can take up as little space as a credit card in your wallet. DSL's small size also means that, in places where there is limited storage space (such as an old hard disk or handheld device), you can devote what space you have to holding your extra applications and personal files.
- **Runs fast!**—Because the DSL operating system and the applications that come with it are small, lightweight, and tuned for efficiency, they run fast, even on meager hardware. If you have at least 128MB of RAM, you can also use DSL's `toram` feature, which runs the entire DSL operating system from memory. Using `toram`, applications launch almost instantaneously and run faster than you would believe.
- **Runs efficiently**—By focusing on important desktop features, instead of every possible desktop feature, the DSL desktop makes it easy to get to the features you need. All your desktop applications and system tools are available with a right-click of your mouse from anywhere on the desktop. Desktop tools let you easily view your system processing, change workspaces, mount storage media, and adjust your audio volume.
- **Travels with you**—By their nature, live CD operating systems are made to be portable. Because of its excellent hardware support, DSL runs on most common PC hardware. So, if you are going somewhere that already has a PC you can use, you may not need to lug your laptop with you. You can simply carry DSL and any extra software or data you need in your pocket.
- **Versatility**—Using the tools that come with DSL itself, you can configure DSL to run in many different ways from different storage devices. Besides the default (a DSL boot image burned to a live CD), easy install procedures let you install and run DSL from a USB flash drive, hard disk, or other storage media.

There are also different ways in which you can configure to save and use DSL, your applications, and your data. For example, you can keep your data on a flash drive, whereas DSL itself is run from a live CD or hard disk. When a new version of DSL comes out, you simply boot that new version and combine it with your data. No messy upgrade or reinstall procedures are needed.

- **Security**—Running your operating system from a read-only media can reduce the ability of an intruder to take over (and effectively own) your computer. If you suspect your computer's security has been compromised, you

can simply do a clean reboot of DSL. The operating system itself returns to its original state, so you only need to check the data you have saved for potential problems.

Because DSL was created primarily as a desktop system, there are also no network services running by default that an intruder could exploit. If you want to turn on or add new network services, you can add firewall software from MyDSL (see Chapter 16, “Setting Up an XAMPP Web Server in DSL”) and configure a professional-quality firewall built on the standard Linux iptables facility.

- **Network and server features**—DSL automatically detects and configures most wired Ethernet cards, and includes tools for configuring many wireless cards. With an available DHCP server on the wire, DSL can often just boot up to an active Internet connection. Applications for using the Internet, web browsing, email, file transfer, instant messaging, and others are included in the basic DSL distribution.

DSL also includes efficient versions of some network servers that you can enable, if you choose. From the DSL menu, select System, Daemon and choose a service to start. Start `ssh` to allow secure remote login (`ssh`), file copy (`scp`), or FTP service (`sftp`) to your machine. Or choose `nfs-common` to be able to share directories over the network. Choose Monkey web server to start a simple web server (HTTP) or `FTPd` to open your DSL system as an FTP server. Because it is Linux, there are also tons of other services you can add to DSL from open source projects.

- **Build projects**—By starting with a minimal operating system, it’s easy to make a system that is configured to do a specialized task. For example, if you want a system tuned just to be a firewall, music player, telephony device, or some other specialized device, you can add only the software you need to an otherwise efficient system. The result can be a system that does just what you need, so all your additional space can be devoted to holding your data. Part IV of this book, “Making Damn Small Linux Projects,” contains several interesting projects you can build, starting with DSL.

The uses and advantages of DSL just described are the ones we have found. After you start using DSL, you will probably find many uses on your own.

GETTING THE MOST OUT OF DAMN SMALL LINUX

Within a short time, you should be able to figure out how to boot from the DSL live CD and use the DSL desktop. However, this book is here to teach you how to adapt

DSL to do exactly what you want it to do. To that end, chapters in this book guide you through techniques for tuning DSL to suit your needs and adapting DSL to suit your computer equipment.

The following are some of the major topics covered in this book.

Booting DSL

With a PC and copy of Damn Small Linux (like the one on this book's CD), most people can reboot and be up and running DSL with no instruction. If some other piece of hardware isn't working, pressing F2 shows you boot options that can help overcome most simple problems.

When you boot DSL, there are other boot-options you can pass to DSL that help direct the boot process. Some of those options can make DSL work better for your particular hardware (such as video cards that can't be properly detected). Others let you run DSL in special ways (such as running DSL completely from RAM). Still others let you identify where bundles of data are located that you can pull into your DSL system (such as your backed-up desktop settings or saved applications).

Boot options you might need to get DSL working initially are included in Chapter 2, "Booting DSL." Some options for identifying where your personal settings are backed up to and restored from are covered in Chapter 4, "Configuring and Saving DSL Settings." Options for running DSL in different hardware environments are covered in Chapter 8, "Installing DSL in Alternate Ways."

Customizing the Desktop

Fluxbox is the window manager that is used by default with Damn Small Linux. Despite its compact size, there are many ways to tune Fluxbox to look and behave the way you like. A window manager defines how menus, mouse activities, keyboard navigation, backgrounds, and other features related to the look and feel of your graphical interface operate.

From the Fluxbox desktop, most DSL activities can be directed from a single desktop menu (right-click the desktop to see the DSL menu). Select Desktop, Fluxbox Configuration to see a listing of available desktop settings that you can change. Figure 1-2 shows examples of these menus.

Besides changing the look and feel of your desktop, you can use various desktop utilities to manage your workspaces, mount and unmount file systems, and manage tasks. Using various desktop tools and applications is described in Chapter 3.

FIGURE 1-2
Customize your desktop settings from the DSL menu.



Adding Applications with MyDSL

Although not everyone needs every available piece of software to run with their live CD, nearly everyone needs at least a few software packages beyond those chosen for DSL. Using the MyDSL facility that was designed for DSL, you can add prepackaged software to your live system, save those packages to restore later, and include them (or not) the next time you reboot DSL.

Chapter 5 includes descriptions of the MyDSL facility. Descriptions of MyDSL center on the MyDSL Extension tool, shown in Figure 1-3.

FIGURE 1-3 Customize your desktop settings from the DSL menu.



Saving and Restoring Settings and Data

For any live CD to be useful over time, you need to be able to save your data files, your system settings, and any additional applications you use regularly, across reboots. DSL offers a lot of flexibility in how you save your personal files across reboots.

The DSL backup and restore features let you choose exactly what files and directories of data you want to back up and where you want that data to be stored. If you save that data in a specific way, DSL automatically finds and restores that data

on your next reboot. The data can be on a disk partition, USB flash drive, or CD, depending on how you chose to store it.

Chapter 4 contains procedures for backing up and restoring your data.

Running DSL on Older PCs

One thing that DSL does better than most operating systems (certainly most new, commercial systems) is let you reuse older computer equipment. DSL works on computers with as little as 16MB of RAM and a 486DX processor (see Chapter 2 for details). In fact, because of its size and efficiency, DSL actually runs well on many machines that some people would just throw away.

To facilitate some of these older machines, DSL developers created special procedures that take into account the weaknesses of some older hardware. For example, you may be dealing with a machine that either can't boot from a CD drive or has no CD drive at all. So, you may need to install DSL to hard disk, and then boot it from a floppy or a boot loader on the hard disk. These techniques are described in Chapter 8.

Building Projects with DSL

The small size and efficient processing of DSL doesn't just make it a neat desktop system. Those attributes also make DSL a great platform for building useful projects. For example, by adding just a few software packages, you can transform that old computer into a useful web server, music server, or Internet telephony machine.

In the Part IV of this book (Chapters 12 through 16), you can find descriptions of projects you can build using DSL as the foundation. Because the operating system and few extra packages don't take up a lot of room, limited disk space can be used to store the music, web content, or other data needed to go with your software project.

Making Your Own DSL Software

There is no MyDSL package available for the software you want. Likewise, you may find it more efficient to put together the software you want on a remastered DSL image than to simply add packages after the fact. This book describes how to handle both of those cases.

In Chapter 11, "Setting up a Full Remastering Environment," there are descriptions of how you can take the software you want and create a shareable MyDSL extension for it. In Chapter 12, "Running DSL on Alternate Hardware," you

can learn how to remaster your own DSL image to include any applications or data you like (without having to merge extra applications and data at boot time).

WHAT IS DAMN SMALL LINUX?

Before heading on any further, we need to define exactly what Damn Small Linux is. Damn Small Linux is an operating system, designed to run from live media (such as a bootable business card-size CD) that, at its heart, is controlled by a Linux kernel. It is based on another Linux live CD called KNOPPIX, which, in turn, was created from a Linux distribution called Debian.

Now, we need to sort all that out.

Understanding Operating Systems

An operating system is computer software that manages the interactions between the computer hardware and the applications you run to use that hardware. In the proprietary personal computing world, you are probably most familiar with Microsoft Windows and Mac OS/X operating systems. In the free and open source software (FOSS) world, most operating systems trace their roots back to UNIX.

Damn Small Linux is one of many FOSS operating systems that carries the Linux name because it includes the Linux software that is referred to as the kernel. The Linux kernel is the most critical part of the operating system because it provides the most basic system services: process management, device driver framework, file system support, and other critical system features. As new hardware, file system types, and other components are connected to a Linux system, they can be added to the kernel in what are called *loadable kernel modules*.

Linus Torvalds created the Linux kernel and continues to lead Linux kernel development today. This software is available from the Linux Kernel Archives (<http://kernel.org>). Most Linux distributions add a set of basic system utilities from the Free Software Foundation GNU project (www.gnu.org), which include many clones of commands that were originally available on UNIX systems.

Although the latest available kernel is the 2.6 kernel, DSL has chosen to stay with the 2.4 kernel tree. This is primarily because the 2.6 kernel is considerably larger. As security holes are found, however, backports of fixes from the 2.6 kernel are included with the 2.4 kernel used by DSL. Backports for improvements can be added in the same way.

Likewise, instead of including the GNU utilities in the basic DSL, many Linux utilities are implemented through a single, compact utility called BusyBox. (Because BusyBox is not completely compliant with the GNU utilities some people

expect, a MyDSL package called `gnu-utils` is available to bring those important utilities into DSL.)

Although the kernel, a command interpreter (called the shell), and a few utilities are really all you need to have an operating system, most Linux systems include other components as well. For example, the X Window system provides the graphical framework for using most Linux systems, including DSL. A window manager (such as Fluxbox in DSL) implements menus, icons, and other graphical desktop elements.

Understanding Live CDs

Most computer operating systems are installed permanently on a hard disk. A live CD, on the other hand, is typically created so that you can safely ignore any software installed on a computer's hard disk and so you can run entirely from the operating system contained on the CD. This has some advantages and some disadvantages.

Live CDs have the advantage of letting you put together a known set of software and be sure that you can return to that software the next time you reboot. This makes a live CD a great medium for demonstrations, portable desktops, or rescue media. You can take a whole computer system with you in your pocket that you can run from most PCs (provided you are allowed to reboot the PC).

The downsides of live CDs include some of the same features that are their attributes. For example, with any system that you use over time, you want to save some data and applications. By default, live CDs are run from the read-only CD-ROM medium. So, you can't just save files the same way you would if you were running your system from hard disk.

Damn Small Linux has overcome many of the challenges of using a desktop system that was designed to run from a live CD. Some features that were already mentioned (and will be described further later in the book) let you save files and applications so they are available the next time you boot DSL. There are also ways in which you can install DSL to hard disk, so it will behave like most installed operating systems.



NOTE

Although the term live CD is commonly used to describe a computer system image that is typically booted and run from a read-only medium, the same type of image can be run from other media as well. As you will see from descriptions in this book, a *live CD* can also run from a DVD, USB flash drive, or ZIP drive. Likewise, a live CD can be booted from a floppy disk, and then continued from CD, hard disk, or other medium.

Based on Debian and KNOPPIX

Because a Linux kernel alone doesn't let you do that much with a computer, most Linux distributions draw on the vast landscape of free and open source software. Debian GNU/Linux is one of the most popular free operating systems available today. KNOPPIX is a live CD Linux distribution that was created from Debian software. Technology from both of those projects is incorporated into DSL.

The Debian distribution (<http://debian.org>) has literally thousands of software packages that have been compiled to run on Debian. Debian packages are stored in .deb format and can be downloaded and installed from the Internet using tools such as `apt-get` and `dpkg`. Many Debian applications can be downloaded and installed to DSL using `apt-get` (available from the `dsl-dpkg` MyDSL package).

KNOPPIX (www.knopper.net/knoppix/index-en.html) was the first popular desktop-oriented live CD. It included a highly regarded facility for detecting and configuring hardware (a must for live CDs). Using compression techniques, it was able to fit the equivalent of about 1.5G of software within a standard 700MB CD image. Many specialized utilities were included in KNOPPIX to configure some of the trickier hardware components, such as wireless cards, printers, and modems.

Damn Small Linux creator John Andrews began with some of the technology just described. Then he began whittling it down and tuning it up.

ANSWERS FROM THE DSL DEVELOPERS

In case you didn't notice from the cover, this book combines the experiences of three writers. John Andrews created Damn Small Linux. Robert Shingledecker has developed many of the critical technical innovations of DSL. Christopher Negus has authored many Linux books, such as the *Red Hat Linux Bible*, *Linux Toys*, and *Live Linux CDs*.

So in this section, you get to find out first-hand how and why DSL came about. Chris asks John and Robert some hard-hitting questions about why they have developed DSL, what are its greatest attributes, and where it is going.

John, what encouraged you to create DSL?

John: It was a reaction to the trend of ever increasing size of applications and the typical Linux desktop environment. I wanted to see if it were possible to build a functional desktop environment that could be compressed into 50MBs.

One of my original draws to Linux was the fast and light applications that were available in the late 90s. By the time I was working on DSL, many of the applications I loved seemed to slow down to a crawl on my computer.

In essence, the typical Linux desktop was pushing me to a hardware upgrade the same way Microsoft and Mac operating systems tend to do. I hoped (and still do hope) that there would be a resurgence of efficiency in the Linux community where people treat code bloat like the cancer it is.

DSL is also a testament to function over form. We avoid over indulging in eye candy. Some core applications that are in DSL have better functionality than their later incarnations that are larger in size. To the developers of DSL, it is not about the latest or the best looking; it is about functionality and stability.

I was searching for a light portable environment that I could take with me on a business card CD. At the time, the best sub 50MB distribution was LNX-BBC, but its orientation is much more toward being a rescue disk. I thought it would be possible to work within the same limited space but instead build a distribution that focused on having a functional desktop. Being an efficiency fan, I modeled DSL after my desktop and used most of the same lightweight applications.

Robert, what encouraged you to join DSL development?

Robert: I have been involved with Linux CD-ROMS since the early 1990s. I created install-type CDs to automate the specialized setup of servers and desktops while I was working at the City of Garden Grove, California. Later, I worked for a Linux startup and created live Linux CD server appliances. We created firewalls, mail servers, VPN, LAMP-style systems, several database servers, MySQL, Postgres, and even some prototype commercial ones like Raining Data's D3.

These live CDs were automated to provide whatever services the customer desired. During this development, I had created my own live desktop. Occasionally, I would check Distrowatch.com to see if anyone else was doing the desktop approach. I always felt that there are far more desktops than servers. Demo Linux and later KNOPPIX were far too slow to be practical for everyday use at that time. When I found John's Damn Small Linux, I liked what I saw and began to explore ways to expand its capabilities.

What were the first goals of Damn Small Linux and have they changed?

John: The first goal of DSL was to have a functional and efficient Linux desktop distribution that was under 50MB, small enough to fit on a business card-size CD. Over the years, business card CDs became a lot less relevant as affordable USB pen drives have started coming into the market. Yet, we have maintained the 50MB upper limit, which has forced us to think in unconventional ways and innovate instead of just adding applications.

The goal of maximum functionality in a tiny package has been a constant. What has changed are the applications and the growth of the extension technology.

Robert: I certainly have not had a roadmap. Things just progressed in an evolutionary way: from adding a flexible backup/restore system to needing a write-enabled `/opt` directory to add more programs. Later, we created self-contained compressed mountable applications, originally called `.ci` extensions, later named UCI. My goal was to honor John's original goal of keeping the distribution at or under 50MB.

Many would remaster DSL only to add or change an application. So, my thoughts were focused on how to allow easy yet flexible additional applications to be added to DSL. These additional applications I called MyDSL extensions. Originally, they were tarballs and UCI. They would either load into the RAM disk under `/opt` or mount under `/opt`. Some of the user community really wanted to use Debian on the live DSL CD. This led to a script to make much of the filesystem write-enabled, which led to the `.dsl` extension type. This is basically a tarball, but the unique extension type would trigger the script to set up all the symlinks needed.

Recently, I added the capability to use mountable compressed overlay images. These new overlay mounts do not need to be self-contained, yet they have the same advantage in low system resource use as the UCI. I try to keep DSL updated with newer technology, while at the same time, keeping the distribution under 50MB and also acknowledging and fully supporting the smaller, older, less capable hardware.

We are constantly looking for the best of breed, *small is beautiful* applications and utilities—for example, Lua. We heavily use Lua and Lua Fltk and create many of our own GUIs. We are not only a small distro; we run well on small resources.

What draws people to DSL?

John: DSL bucks the trend of ever-increasing bloat and the ever-increasing demands on hardware. People who use DSL are not into eye candy for eye candy's sake. They want their computer to work and be reliable. The fact that DSL runs from an ISO image and is inherently durable also makes it appealing, DSL is very hard to break and easy to fix. Of course, there is the modularity and portability aspects, too.

If you want an application, you can just grab it. If you want to take your desktop on the road, it is very easy to do via USB pen drive, or live CD and remote backups. DSL's small but functional base also makes a great platform to build on for custom applications. DSL is a Linux desktop without the 500 pounds of Styrofoam padding.

Robert: DSL is a small distribution and one that runs very well on very small resources. It is extremely flexible in offering many choices of configuration and expandability. After you read the chapters that follow, you will begin to realize the potential.

The DSL project welcomes the user community. The MyDSL extensions only represent the framework. The actual extensions are requested, discussed, and created by the community of DSL users. This active community shares in the ownership of these seamless extensions.

What is the most interesting hardware known to running DSL?

Robert: What comes to my mind is the original ThinkNic Internet Appliance, which is a CD-based machine with a 4MB ramdisk (to save configuration), a Winmodem, and an Ethernet port. We fully support this “first of breed” Linux appliance.

John: For me, the most interesting hardware to run DSL has not been applied yet—there are so many possibilities. I personally work on a homemade laptop based on a eBox III thin client and a cheap 8-inch LCD monitor. I’d like to be able to hook it up to a small solar panel. It will have to run an IDE flash Disk On Module (dom); it will be passively cooled and 100% silent.

Why is DSL good for hobbyists?

John: Oh, there is just so much you could do with DSL. It is small, it requires very little RAM, it can run on ancient hardware, and it can run without a hard drive. DSL can run in RAM with as little as 128MB. It could run with as little as 16MB of RAM with a conventional hard drive install. With DSL, you can take junk and make it into workable hardware.

DSL is also easy to modify, and upgrade. We have an extension system that allows DSL to morph in any direction a developer could want without the need to do a custom remastering. We make heavy use of scripting languages. So if you want to get into the meat of what makes DSL DSL, all you have to do is dig around.

Robert: The fun of tinkering with that old hardware you found in the closet. Now you have a neat small web server, a picture frame, or a car MP3 player. Your creativity is set free to explore and share with a community of DSL users. You can create and share MyDSL extensions or learn to code with Bash, Perl, C, Lua, Lua/Fltk. It’s all in there.

DSL includes lots of hardware support. So, you can build a web surfing appliance for Grandma. Or perhaps buy or obtain old “throw-away” laptops. We support many of them. Or even buy an embedded device and use DSL as the embedded OS. We are like Tinkertoys for Linux: a Linux construction kit. It’s all about having fun!

What are the challenges to someone who comes to DSL from MS Windows?

John: In the modern MS desktop, you are prevented from looking under the hood. In DSL, there is no hood at all—you are free to dig as deep as you want to. There

are no restrictions, and you will want to learn a little about the way DSL works to get the most out of it.

Robert: All the decisions are NOT forced on you. If tinker toys or a construction kit are not fun for you, the basic desktop is still fully functional when you start out. However, with so many choices and options available for extending DSL, it can be overwhelming to a new user. But they will soon want to explore.

Even the community of DSL users does not agree on a single installation or runtime environment for DSL. We often have “Tastes Great! Less Filling!” types of forum debates.

Also, DSL is Linux, and therefore we respect the UNIX file permissions. Some users are used to running everything as the superuser. We do not. Some expect every new device to be instantly supported, which is not possible given our constraints of size and development. Usually, answers and solutions can be had within the resources of the community.

What future plans do you have for DSL?

John: Tough calls lay in our future. The truth is, very few in the Linux applications development community sees the future of Linux the same way we do. This puts us in a bind. Many of the lean projects are getting abandoned and replaced with other projects that have an enormous amount of package dependency.

Our old friend GTK1.2 is being left behind by most currently developed projects. Other light graphical tool kits are slow in development or even stalled for years at a time. There are a few nuggets of hope out there, and I will never give up on the pursuit of a tiny and functional desktop. I hope that projects like DSL encourage developers of lean applications to continue their work.

In the shorter run, you will likely see a smaller and a larger DSL cousin, as well as more framework for those who want to build custom applications based on the DSL infrastructure.

Robert: I would like to see more modularization of DSL. Offer even more choices to the community. Our process is not formal. It is evolutionary based on our own interests and those expressed by the community of DSL users. And it must be fun and interesting for me and John too!

THE DAMN SMALL LINUX COMMUNITY

Damn Small Linux has a thriving, active community of contributors and users. Although Robert and John direct the activities of the central 50MB DSL distribution, the framework for MyDSL extensions offer the opportunity for anyone to extend the functionality of DSL for themselves and others. To grow the knowledge

base of DSL, there are several communications venues available. And, of course, financial contributions are welcome for helping the project grow.

Communications opportunities for the DSL project include forums, a wiki, and a place to blog about DSL. Here's where you can find out more about those opportunities:

- **DSL forums** (www.damnsmalllinux.org/cgi-bin/forums/ikonboard.cgi)—In the forums, you can find information on more than 30 topics relating to DSL. Popular topics include hard drive installs, DSL ideas and suggestions, and networking issues.
- **DSL wiki** (www.damnsmalllinux.org/wiki)—The DSL wiki brings together a lot of information related to the DSL project. From the wiki, you can find answers to frequently asked questions, learn about installation and boot options, and read about common issues that DSL users encounter.
- **DSL IRC** (<irc://irc.freenote.net/damnsmalllinux>)—Participate in real-time, online chats with other DSL users.
- **DSL blog** (www.damnsmalllinux.org/talk)—At the DSL blog, you can feel free to present your musings and personal experiences that relate to Damn Small Linux.

Because DSL is freely distributed, development is funded through contributions and through purchases from the DSL store. Contributing to DSL in one of these ways can do a lot to further development of Damn Small Linux. Here are suggestions for contributing:

- **DSL donations** (www.damnsmalllinux.org/donate.html)—If you enjoy DSL and can afford to contribute, monthly subscriptions of \$1, \$2, \$5, and \$10 contributions can be made from this page. You can also make one-time donations via PayPal or credit card.
- **DSL store** (www.damnsmalllinux.org/store)—At the DSL store, you can purchase a variety of mini-ITX computer supplies. This is also the place to buy a DSL CD or DSL on a bootable USB pen drive (currently, 1GB models are offered). One of the great features of the bootable USB drive is that it includes the QEMU version of DSL that can be booted and run on a Windows desktop.

Before I became associated with John and Robert to write this book, I purchased a DSL USB pen drive from the DSL store. I still use that drive today to show people DSL. I can plug the USB drive into a running Windows system, select one file from that drive, and in a few moments give a demonstration of Damn Small Linux within a window on the Windows desktop.

ON THE CD

DSL itself only takes up about 50MB of space on your boot media. However, with several different versions of DSL (for booting from different media) and some available MyDSL software extensions, you can experience DSL in different ways. For those reasons, we have included a standard-size CD with this book (about 700MB) that we have filled with a whole lot of software you can use with DSL.

The CD that comes with this book boots up to the latest version of Damn Small Linux. By default (press Enter), you will get exactly what you would were you to download the standard 50MB DSL image from the Internet. With our specially remastered CD, however, you get a whole lot more.

- **Official Damn Small Linux (dsl-3.3.iso)**—This is the standard DSL that you would normally burn to CD and boot live.
- **Official DSL for older machines (dsl-3.3-syslinux.iso)**—If you have a PC that requires a floppy boot image on the CD to boot up, you can use this ISO image. This image (contained in the `/images` directory) features the Syslinux boot loader, which includes a small 1.4MB boot image. To use this ISO, you need to burn it to a separate CD.
- **Virtual DSL for Windows with QEMU (dsl-3.3-embedded.zip)**—This archive is unzipped on the live CD so that you can run DSL virtually within a window on your Windows desktop.
- **Virtual DSL scripts for VMware (dsl-3.3-vmx.zip)**—Using the scripts included in this zip file, you can run DSL virtually from a variety of environments using VMware.
- **Special DSL projects**—Chapters 13 through 16 describe how to create special software and hardware projects with Damn Small Linux. You can directly boot up to versions of DSL that include the software packages needed to complete those projects. These projects include:
 - DSL Edna music server:** Manage, play, and serve your music collection from DSL using Edna music server software (see Chapter 13, “Making an Edna Music Server in DSL”).
 - DSL Skype VoIP service:** Make Internet telephone calls using Skype IP telephony service (see Chapter 14, “Using Skype VoIP Service in DSL”).
 - DSL digital picture frame:** Play slide shows of any collection of digital images from DSL as a standalone digital picture frame (see Chapter 15, “Running a Digital Picture Frame in DSL”).

- DSL web server:** Include XAMPP software with DSL to create an instant web server to share your web content over the Internet (see Chapter 16).
- **DSL boot images**—Some older hardware that has no bootable CD drive (or no CD drive at all) may need a floppy boot image to be able to boot DSL. Several different boot images are included in the `/images` directory of the CD.
- **Chapter 10 and Chapter 11 scripts**—Scripts that are described in Chapter 10, “Adding Applications and Creating Shareable Extensions,” and Chapter 11 in this book are contained in the `/chapter10` and `/chapter11` directories, respectively, on the CD. The scripts will help you make your own MyDSL extensions and remaster your own DSL live CD.
- **MyDSL packages**—There are several extra software packages that are very popular with DSL users. By including some of these packages, available as software extensions with the MyDSL facility, on the CD, we can save you the trouble of downloading them over the Internet. In the `/mysdl` directory in the top-level directory of the CD, you can find packages for installing standard GNU utilities (`gnu-utils` package), ALSA sound drivers and utilities (`alsa-sound` package), and the OpenOffice.org office applications (`openoffice` package).

You can use the software contained on the CD if you don't have an Internet connection. As time goes by, however, you should check the Damn Small Linux website for the availability of later versions of the software included on the CD.

SUMMARY

Damn Small Linux is the premiere business card-size Linux desktop live CD available today. Within its 50MB footprint, DSL contains nearly every type of application you would expect to find in a modern desktop operating system. Although DSL is designed to run from a read-only CD medium, you can add data, software extensions, and system settings that can be backed up separately and used again the next time you reboot.

This chapter is an introduction to the features that make DSL both a useful and fun operating system for computer enthusiasts. It presents some of the ways in which you can boot, install, reuse, and enhance DSL that are described in greater depth in later chapters of the book. It also discusses ways in which you can learn more about the DSL community and contribute to its success.