An Engineer's Primer on Linux, Firefox, Thunderbird and OpenOffice

A White Paper by:

Brent Scott LaReau,
Consultant
www.designsbylareau.com

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Brent Scott LaReau, *Consultant*
Voice/FAX (U.S.A.): 847-428-4923
E-mail: B.LaReau@DesignsByLaReau.com
Web: www.DesignsByLaReau.com
Mail (U.S.A.): 2413 W. Algonquin Road, PMB #258
Algonquin, IL 60102-9776

About the Author

Brent Scott LaReau has been an independent consultant since 1987.

He provides design and development services in electronics, software, embedded systems and devices, web and intranet sites, knowledge base construction, technical writing, Information Security, and on-site training/mentoring. He is proficient in heterogeneous system design, where diverse components use different programming languages, interfaces, databases, networks and communications protocols.

Brent earned his BSEE at Marquette University, graduating first in his class. His academic awards include the International Engineering Consortium's (IEC's) *William L. Everitt Award*, Marquette University's *Top Scholars in Curriculum Award*, and the College of Lake County's *Outstanding Academic Excellence in Mathematics* and *Outstanding Scholar Award*.

He is a member of the Institute of Electrical and Electronics Engineers (IEEE), the Association of Computing Machinery (ACM), and American Mensa, Ltd.

Contents

Part 1

Introduction and Overview

"*If a man does not keep pace with his companions, perhaps it is because he hears a different drummer. Let him step to the music which he hears, however measured or far away.*"
—Henry David Thoreau (1817-1862)

Security is a major concern as we become ever more dependent on data communications networks such as the Internet to conduct our business. We have seen an exponential increase in spyware and other malware, which place our identities and our confidential data at risk[1]. Any engineer whose computer has suffered a malware infection doesn't want another such experience—ever.

Computer security vendors would have us believe that security can be purchased—from them—at a price. But Information Security experts know that you cannot purchase security. Information Security is a *process*, not a product. This process requires a "layered" approach, where malware must surmount many obstacles before finding a vulnerability to exploit.

One way to create an obstacle is to *not* use what everyone else is using, since those who create malware are not so stupid as to select targets that are very rarely found. Instead, malware writers target what "everyone" is using: Microsoft software, especially Windows, Outlook, Internet Explorer, Microsoft Office, and Media Player.

For this reason, **Linux** and applications such as Firefox, Thunderbird and OpenOffice remain immune to normal malware. You can relax—Linux puts the fun back into personal computing!

Besides being immune to malware, Linux offers zero licensing costs, excellent reliability, and an ability to run well on older PCs. Arguably, Linux runs on far more hardware platforms than any other operating system on the planet—cell phones, webcams, personal video recorders, game systems, PCs/Macs, mainframe computers, multi-node clusters, and supercomputers. It's an engineers' delight.

Plus, a great number of Linux software applications are available—for free. For example, OpenOffice is a suite of software applications that is similar to Microsoft Office. Firefox is a popular web browser with many advantages over Internet Explorer. Thunderbird is an easy replacement for Outlook Express. These three applications are just the tip of the iceberg.

Interestingly, OpenOffice, Firefox and Thunderbird are available for Windows, too. Since malware commonly enters Windows computers through two major entry points—Internet Explorer and Outlook—replacing these with Firefox and Thunderbird can dramatically increase your Internet security when using Windows.

This White Paper shows how you can get Linux up and running on most PC-compatible (x86-based) computers in less than five minutes—risk-free and cost-free—by running Linux from a CDROM instead of installing it to your hard drive. You can install Linux to your hard drive later if you wish.

We will also introduce Firefox, Thunderbird and OpenOffice, which together fill most engineers' three biggest needs: Web browsing, e-mail and office productivity. These three applications are included with many versions of Linux (including the CDROM-based version mentioned previously), so you can try them without having to install them.

(*Hmmm... easy, quick, free, secure, and powerful. Gee, I wonder if I should try any of these?*)

[1] See "*An Engineer's Primer on Information Security*" by this author, available at his web site [5].

Part 2

Linux

Linus Torvalds began to create the Linux kernel while he was attending the University of Helsinki in 1991. He was 21 years old. Today, Torvalds and more than two dozen other distinctive programmers continue to refine the kernel.

2.1 The Operating System Is NOT the Computer!

For many years, most computers have been pre-loaded with an operating system—usually Windows or Mac OS—before being shipped from the factory. Therefore, most people (including some engineers) intuitively feel that an operating system is somehow integrated with a computer's hardware.

But in fact, an operating system is a replaceable part even though Microsoft would have everyone believe otherwise. Therefore, you can choose which operating system to run on your computer hardware.

For example, you could choose to run *Linux*. It's free. It's meant to stay up for months at a time. Its license has impossibly easy terms compared to Microsoft's. You can install Linux on as many computers as you want. You can give copies to everyone you know. And you can run your business on Linux—like this author has for four years.

2.2 Meet the Kernel

Linux, which is usually pronounced "Linnucks", is actually just the *kernel* of an operating system, not the entire operating system. It must be surrounded by a large set of additional software to create a normal, fully-functioning operating system.

The first Linux-based operating systems were completed in 1992 by combining system utilities and libraries from the GNU Project [13][1] with the Linux kernel. Therefore, we should really say "GNU/Linux" instead of "Linux", but most people use the latter term for brevity.

2.3 GNU/Linux

GNU, which stands for "**G**NU is **N**ot **U**nix", is a large collection of software libraries and applications that together create a Unix-like operating system. This makes GNU/Linux a Unix-like operating system too[2].

GNU/Linux has all the features you would expect in a modern fully-fledged Unix, including true multitasking, virtual memory, shared libraries, demand loading, shared copy-on-write executables, proper memory management, and multi-stack networking including IPv4 and IPv6.

As GNU/Linux matured, various people, groups and companies began to produce and distribute customized versions. Hence, a particular version of Linux is called a *distribution*, or *distro* for short.

In recent years it has become much easier to "roll your own" version, especially if your version is based on someone else's. In the Linux world it's perfectly legal and acceptable to do that—it's an *engineer's* operating system. More than 200 distributions are currently available.

[1] Numbers inside square brackets denote one or more cited references, which can be found at the end of this White Paper.

[2] Most people don't know that Mac OS X is Unix-like as well, but that's a different story.

2.4 Live CDs: Zero to Linux in Two Minutes

Until a few years ago, you had to install Linux on your hard drive—just like DOS or Windows. Then someone invented a low-risk alternative: the "Live CD".

Live CDs boot and run Linux entirely from a CDROM. A hard drive is not required. If a hard drive exists it won't be touched unless the user chooses to do that.

Here are some important facts about Live CDs:

- Live CDs start applications *much* more slowly than hard drive-based versions of Linux, because it takes time to "spin up" a disk. Be patient.
- Some Live CDs automatically disable write-access to hard drives upon boot-up, for safety. You have to explicitly enable write-access.
- Some Live CDs can't write files to NTFS-formatted hard drives or partitions, due to technical reasons.
- Don't be surprised if some of your hardware devices won't work—it's impossible for Live CDs to include a device driver for every network card or USB device. Remember that Windows doesn't include every driver either!
- Many modern Live CDs include a hard drive installation utility for those who want to commit.

A brief survey of popular Live CDs that this author has evaluated is provided below. Various other surveys and reviews exist on the Web [3, 10, 11, 12].

2.4.1 Versions for Windows Users or Linux Newcomers

Some Live CDs are aimed directly at Windows users or Linux newcomers who want the least shock to their systems when trying out Linux for the first time.

PCLinuxOS is extremely nice looking, works very well, and has received rave reviews for several years [1, 2, 3]. This author thinks that PCLinuxOS is one of the best versions for those who don't already know Linux—it's definitely a "must-try" version of Linux (see Section 2.6). You can run PCLinuxOS from its CDROM in "Live CD" mode, or install it to your hard drive. With PCLinuxOS you use OpenOffice to create text documents, spreadsheets, drawings and slide presentations. You can browse the web with Firefox, send and receive e-mails with Thunderbird, and chat with friends on Yahoo, MSN, AOL or IRC. You can play games, listen to music, share files, rip music CDs, watch videos, burn CDs and DVDs, and view and edit pictures. An extra 5,000 software packages can be downloaded. A free e-magazine is published monthly. Web sites: http://www.pclinuxos.com and http://mypclinuxos.com

SimplyMepis has received good reviews [6]. It contains applications necessary for most people's productivity, and thousands more software packages are available for free download. SimplyMepis includes OpenOffice (word processor, spreadsheet, presentation, database, drawing, and math editor), Thunderbird (e-mail), Firefox (web browser), GIMP (image editor), and games like Tux Racer and KSudoku. You can watch videos with Real Player, play your favorite music with Amarok, and connect to your iPod or digital camera. You can also connect to chat networks like Yahoo or ICQ, and use free Internet telephony with Skype. Web site: http://www.mepis.org

SLAX "KillBill" Edition not only emulates the traditional Windows look and feel, but it will also run many Windows applications through the use of Wine (**Win**dows **E**mulator, which imitates the Windows API). SLAX has received good reviews [3, 4], and this author uses KillBill to run certain Windows applications under Linux during his training classes. SLAX is described in more detail in Section 2.4.3.

2.4.2 Flagship Versions

A few Linux Live CDs are known for their extra capabilities, or for containing massive amounts of software. They are useful tools for Linux Geeks, but are *not* for those new to Linux.

Knoppix is the basis for many other Live CDs and is one of this author's favorite Live CDs. It's widely known and receives good reviews [3, 8,

9]. Knoppix packs a staggering 2GB of software into a standard 700MB CDROM, using a file system compression technique. If you need portable geek tools—*lots* of tools—then Knoppix is your Live CD of choice. Knoppix includes recent Linux software and desktop environments, OpenOffice, The Gimp, Apache, PHP, MySQL, and utilities for data recovery and system repairs of various operating systems (including Windows). Knoppix has web browsers, network and security analysis tools, many programming languages, development tools, and libraries for developers. In total, Knoppix includes more than 900 installed software packages with over 2000 executable user programs. But unlike other Live CDs, Knoppix is *not* intended for hard drive installation. It must be run from CDROM only. Web sites: http://www.knoppix.net and http://www.knopper.net/knoppix/index-en.html

SLAX Server Edition is a member of the SLAX family as described in Section 2.4.3. SLAX has received good reviews [3, 4] and is recommended by this author. SLAX Server Edition boots up with many Internet services ready to use, including DNS, DHCP, HTTP, FTP, SMTP, POP3, IMAP and SSH. It also includes the MySQL database.

2.4.3 Small Versions

Some Linux Live CDs are deliberately trimmed to 180MB, or in some cases 50MB or less, so that they can be burned onto smaller sizes of CDROMs (including the so-called "business card" size).

Damn Small Linux (DSL) is one of the smallest—50MB—but it's glossy, quick and incredibly comprehensive for its size. This author has successfully used DSL for years, across a broad range of computers. DSL consistently receives good reviews [3, 7]. DSL was originally developed as an experiment to see how many usable desktop applications could be fit into 50MB. One unusual feature is that you can run DSL inside Windows, but most people run it as a Live CD. Another unusual feature is that it is light enough to power a 486DX with 16MB of RAM. You will be amazed at how fast your computer can be! DSL has a nearly complete desktop, many command line tools, and the ability to act as an SSH/FTP/HTTP server right off. DSL also includes multimedia players (MP3, CD Music, and MPEG), an FTP client, web browsers, spreadsheet, e-mail, spell-check, text editors, graphics editing and viewing, PDF Viewer, file manager, chat clients (AIM, ICQ, IRC), PPP, PPPoE (ADSL), calculator, generic and GhostScript printer support, games, system monitoring apps, a host of command line tools, USB support, PCMCIA support, and some wireless support. You can even buy *The Damn Small Machine*, a Nano-ITX-based computer preloaded with DSL, through DSL's web site: http://www.damnsmalllinux.org

SLAX is actually a "family" of solid Linux versions, each of which contains a collection of useful software while limiting their core size to 185MB. SLAX is unusual in that it is modular; you can customize the system to fit your needs, by adding additional software in the form of compressed modules. The combination of small size and modularity makes SLAX faster than most other Live CDs. The SLAX family includes these "Editions": Standard, KillBill, Server, Popcorn, and Frodo. The SLAX family has received good reviews [3, 4] and is recommended by this author. Web site: http://www.slax.org

2.4.4 USB Versions

With the explosion of USB devices during recent years, it is no wonder that recently manufactured PCs can be configured to boot from a USB drive (a.k.a. flash drive, memory stick, thumb drive, mini hard drive or etc.).

Many popular versions of the smaller Linux Live CDs offer tools or instructions that allow you to install them on any USB drive.

USB-bootable versions of Linux include:

SLAX (all versions). Noteworthy is the Popcorn Edition, which fits even on a 128MB USB Flash drive. SLAX is recommended by this author and gets good reviews [3, 4]. See Section 2.4.3 for more information on SLAX.

Damn Small Linux at only 50MB will fit into even the tiniest USB drive, with amazing results–hence the good reviews [3, 7]. It is one of this author's favorite small versions of Linux. See Section 2.4.3 for more information on DSL.

2.5 OK, What's the Catch?

The only "downside" to Linux is actually one of its strengths. Linux is not *natively* compatible with any Windows application software. You probably cannot *immediately* install AutoCad, Photoshop, MathCAD, Visual Studio, Quicken or most anything else you may already own.

But that's actually a strength—*because viruses, spyware and other malware won't run either*.

But don't give up hope if you absolutely must run those Windows applications under Linux. If you're willing to dig a little deeper into the Linux world you will discover two software packages that may help: Wine and Mono.

2.5.1 Wine, so Sweet

Wine, which stands for **Win**dows **E**mulator, imitates the Windows API so that many Windows applications can run under Linux. Some versions of Linux, such as SLAX KillBill Edition mentioned in Section 2.4.1, come with Wine already installed. This author was astounded to find that some of his Windows software worked under Wine without any reconfiguration, but this may not be typical for many users.

You can purchase a commercial version of Wine, known as CrossOver, from a company called CodeWeavers (http://www.codeweavers.com). CrossOver is known to run over 200 Windows applications, including some versions of Photoshop, Visio, Lotus Notes, Quicken, Microsoft Project, Act!, QuickBooks, Framemaker, WinZip, Xilinx ISE Alliance, Meta Integration Model Bridge, AutoCAD, Visual Studio, SciFinder Scholar, OneNote, Origin, TurboTax, Money, Minitab, WinRAR, UltraEdit, MPLAB, IGOR Pro, WordPerfect Office, Schedule+, eFax Messenger, eWallet, and others.

Or, once you become accustomed to Linux, you can install and "tweak" Wine yourself, to see if you can run that critical Windows application under Linux.

2.5.2 Mono: A Safety ".NET"

Many people have heard about Microsoft's ".NET" initiative, which provides a framework on which the newest Windows application software will run. But few people know that the underlying components of ".NET"—the Common Language Infrastructure (CLI) and the C# programming language—are based on ISO/ECMA standards.

Mono is a non-Microsoft implementation of those standards. It provides the necessary software to develop and run ".NET" client and server applications. In short, Mono can run ASP.NET, Winforms, ".NET", Java, Python and other application software, on either Linux or Windows (the "write once, run anywhere" philosophy).

The bottom line is that you may find more and more software originally written for Windows, that will automatically run on Linux via Mono.

2.6 How to Get Started with Linux—Now!

Here is "the path of least resistance" for those new to Linux who wish to get started immediately:

1. **Make a PCLinuxOS Live CD**. Refer to Section 2.4.1. You will need to download an ISO file from the PCLinuxOS web site, verify the ISO's MD5 checksum, and then use CD "burning" software to make a bootable disk. Make use of Google if you need to learn how to download, verify or burn.
2. **Boot** the PCLinuxOS Live CD using any standard desktop PC[3]. When prompted, press Enter to select "`Live CD`" from the displayed menu. **Important:** *These instructions were based on PCLinuxOS version 2007 TR3. Other versions may be dissimilar.*
3. **Configure** PCLinuxOS by answering the simple prompts. Pay special attention to networking details, since only *you* know your network topology (wireless, firewall, etc.).
4. **Log in** by clicking the guest icon when prompted. Enter a password of "`guest`" (lowercase, without quotes)[4], and press the Enter key.

[3] Many laptop PCs contain nonstandard circuitry that would require you to "tweak" some settings within Linux. This is best left for later unless you have no desktop PC, in which case you should "go for it!"

[4] Everything is *case-sensitive* in Linux and other Unix-like operating systems. As a side note, Web URLs are also case-sensitive because most web servers have traditionally used a Unix-like operating system.

5. **Explore**. The "PC" button in the lower left corner of the screen is equivalent to Windows' "Start" button. Click it to see what PCLinuxOS' main menu looks like.

6. **Go surfing**. Bring up Firefox and surf the web ("PC" → "Internet" → "Mozilla Firefox").

7. **Connect a USB drive** (a.k.a. flash drive, memory stick, thumb drive, mini hard drive or etc.). When prompted, choose "Open in New Window" and you will see files and folders on that device.

8. **See your files** by opening "My Computer" → "Storage Media". You should see one or more hard drives or partitions, plus your USB drive (if attached). You can navigate into their folders and open files if you wish. **Important**: PCLinuxOS by default *won't* let you write files to the computer's hard drive[5], but it *will* let you write to a USB drive[6].

9. **Locate other computers** on the network. Open "My Computer" → "Remote Places" → "Samba Shares" to see them. You can navigate into their folders if you wish.

10. **Set up a printer** if PCLinuxOS did not already find your printer. Open "My Computer" → "Print System" → "Printers" to see if your printer is shown. If it is not shown, click "PC" → "System" → "Configuration" → "Configure Your Computer", and then:

    (a) Enter the password "root" when prompted.

    (b) Click the "Hardware" tab on the left side of the screen, then click "Set up the printers(s)...".

    (c) Respond "Yes" when asked whether to automatically start the print system on boot.

    (d) At the Printers screen, go to the "Actions" menu and select "Add Printer".

    (e) Leave auto-detect options set and click "Next". Select a detected printer and click "Next".

    (f) Confirm that the model is correct. Next, print a standard test page and confirm success. Exit the printer setup screens.

11. **Start OpenOffice** and create a few documents ("PC" → "Office" → "OpenOffice.org"). **Important**: See item 8 for some important notes about saving (writing) your document files to a USB drive instead of your hard drive.

12. **Read the free magazine** at PCLinuxOS' web site [15]. It's a good way to pick up tips and techniques. Back issues are also accessible.

13. **Read more about Linux**. "HOWTOs", guides, "FAQs" and other Linux documentation are widely available on the Web [14].

14. **Disconnect your USB drive**. Open "My Computer" → "Storage Media" and find your USB drive's icon. Right-click on it and select "Safely Remove" before unplugging the drive.

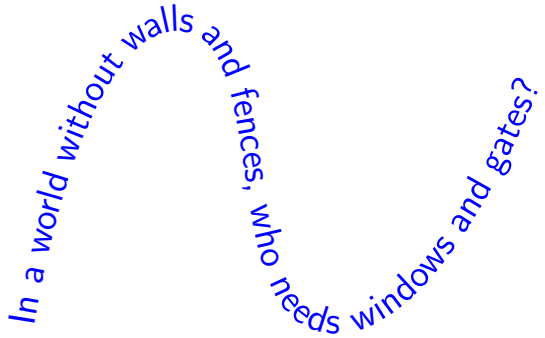
15. **Shut down PCLinuxOS**: "PC" → "Log Out" → "Turn Off Computer" (or "End Current Session"). If PCLinuxOS takes you back to its initial log-in screen, use the System Menu to select Shutdown.

16. **Join** a local Linux User's Group (LUG) [16].

17. **Read magazines** about Linux at the larger bookstores. Titles include *Linux Magazine*, *Linux Journal*, *Linux Format* and others.

[5] Advanced users *can* write to a hard drive, as long as it's not formatted with NTFS, by using a file manager application in *super-user* mode ("PC" → "System" → "File Tools" → "File Manager - Super User Mode"). This requires entry of the root password, which for PCLinuxOS is simply the word "root". NTFS write capability will likely be added to PCLinuxOS sometime in 2007.

[6] USB drives cannot be written to if they are formatted with NTFS. PCLinuxOS does not yet support NTFS write operations; it only supports NTFS read operations. This is expected to change sometime in 2007. Note that NTFS-formatted USB drives are rare, so don't worry about this.



Part 3

Firefox

Firefox has taken the world by storm.

3.1 Internet Explorer Is NOT the Internet!

An amazing number of laypeople believe that Internet Explorer is "the Internet", because that's the application they use to interact with the Internet.

In reality, Internet Explorer is but one of many available web browsers. Firefox is arguably the most popular alternative to Internet Explorer. Firefox runs on both Windows and Linux.

3.2 Firefox Emerges from Its Hole

Version 1.0 of Firefox was released on November 9, 2004. As of February 12, 2007 Firefox had been downloaded from its official web site more than 300 million times. If you've never used Firefox, it's time for *you* to join the party too.

3.3 Tabbed Browsing? Cool!

If you've never heard of "tabbed" browsing, you're in for a treat. It's a feature that allows you to open more than one web page in the browser. Each open page is represented by a "tab" at the top of Firefox's window; clicking on any tab instantly change your view back to that page. You can "drag and drop" tabs to keep related pages together.

Tabbed browsing is most useful because Firefox allows you to open a link in a new tab, automatically keeping track of "where you came from" by saving the old page in another tab. This author commonly has 5-20 web pages loaded into Firefox during his workday.

3.4 Other Features

According to Firefox's web site, other features included with Firefox are automatic pop-up blocking, a streamlined interface, incremental find (via the Find toolbar), Live bookmarking, an integrated download manager, and a search system.

The user can customize Firefox with feature-packed "plug-ins", extensions, themes, and advanced preferences. Firefox also provides an environment for web developers in which they can use built-in tools or extensions.

3.5 Automatic Updates

Firefox's update system always checks to see if you're running the latest version, and notifies you when a security update is available. These security updates are small (usually 200KB - 700KB), giving you only what you need. Updates are downloaded and installed automatically once approved.

3.6 Security

Firefox does its part to help keep you safe from spyware, hackers, scammers and spammers. Firefox will

not allow a web site to download, install, or run programs on your computer without your explicit agreement. Period. You will be notified whenever a web site wants to download or install software, and Firefox will always tell you what's happening so that you can stay in control of your computer.

ActiveX software components are not natively supported by Firefox, which is good, because ActiveX allows a web site to do anything it wants to your computer (such as delete files or even re-boot).

You may run across a few web sites that refuse to work with Firefox, but fortunately these are becoming ever more rare as Firefox's popularity increases.

3.7 Privacy

Firefox offers the ability to clear all your private web browsing data with just one click. Or, you can set Firefox's options to automatically clear private data upon exit. You can be confident that when you clear your private data in Firefox it's gone—whether you are using your own computer or a public computer.

3.8 Getting Firefox

Some Linux Live CDs include Firefox, making it very easy to evaluate without risk.

Or, you can download Firefox directly from its web site: http://www.mozilla.com/en-US/firefox .

Installing Firefox won't affect Internet Explorer, but for convenience Firefox will adopt any "favorites" you may have established for Internet Explorer.

Part 4

Thunderbird

Stop using Outlook—NOW!

4.1 Outlook Is NOT the E-mail!

An amazing number of laypeople believe that Outlook (or Outlook Express) is "the e-mail", because Outlook is what they always use to get their e-mail.

In reality, Outlook is but one of many available e-mail applications. Thunderbird, which is Firefox's companion, is one of the most popular alternatives to Outlook. Thunderbird runs on both Windows and Linux.

4.2 Features

According to its web site, Thunderbird is simple to use, powerful, and customizable. It supports IMAP and POP mail protocols, as well as HTML mail formatting. You can easily import your existing e-mail accounts and messages. Built-in RSS capabilities, powerful quick search, spell check as you type, global inbox, and advanced message filtering round out Thunderbird's modern feature set.

4.3 Security

Thunderbird provides enterprise and government grade security features including S/MIME, digital signing, message encryption, support for certificates and security devices. Attachments are never run without your express permission, protecting you from many worms and viruses if you are using Windows.

Thunderbird helps to protect you from increasingly common e-mail scams—also known as 'phishing'—which try to fool you into handing over your passwords and other personal information. Thunderbird will tell you when it thinks a message might be a scam. But please, *never* blindly trust any technological assistance. Always be on guard against security risks.

4.4 Spam Filtering

Each e-mail you receive passes through Thunderbird's leading-edge junk mail filters. Each time you mark messages as spam, Thunderbird improves its filtering so you can spend more time reading the mail that matters. Thunderbird will also use your mail provider's spam filters to keep junk mail out of your in-box.

4.5 Customization

You can customize Thunderbird—select new button controls for your toolbars, install extensions to add new features, or change the look of your browser with 'themes'.

4.6 Automatic Updates

The new Software Update feature makes it easy to get the latest security and feature updates to Thunderbird. Thunderbird automatically downloads these small updates in the background and prompts you when they are ready to be installed.

4.7 Getting Thunderbird

You can download Thunderbird directly from its web site: http://www.mozilla.com/en-US/thunderbird .

Installing Thunderbird won't affect Outlook, but for convenience Thunderbird will import all your mail and mailbox settings from Outlook.

Part 5

OpenOffice

"*First they ignore you, then they laugh at you, then they fight you, then you win.*"
—Mohandas K. Gandhi (1869-1948)

5.1 Excel is NOT the Spreadsheet!

An amazing number of laypeople believe that Excel is "the spreadsheet", because Excel is what they always use to produce a spreadsheet. Similarly, they think that Word is "the document", and that PowerPoint is "the presentation". Microsoft Office is their whole world.

In reality, Microsoft Office is but one of many available office suites.

5.2 Not so Suite

Objectively, this author doesn't think Microsoft Office is so "suite". Let's focus on just two main facts.

FACT 1: Most people who use Microsoft Office didn't pay for it, or wouldn't pay for it. Why?

1. Most people who use Microsoft Office at home are either using a "pirated" copy, or bought a computer with Microsoft Office pre-loaded on it "for free".
2. Most people who use Microsoft Office at work are using their company's copy "for free".
3. When I pin down an engineer who is a loyal Office user, he will usually say something like, "Are you nuts? *I'm* not paying $400 for Microsoft Office". Translation: He will use a pirated copy.

5.3 Beware the EULA

FACT 2: Most people who use Microsoft Office have never read its EULA (End User License Agreement). If they did, they wouldn't like it at all. It says:

1. DOC, XLS, PPT, MDB and future types of disk files written by Microsoft Office must only be read by Microsoft software, or by software duly licensed by Microsoft (this is called "vendor lock-in"). This will be enforced by Windows Vista via IRM and TCM [17]. In short, *you* own the text or visual content *you* created, but Microsoft owns the file format in which *your* content is stored. You cannot legally "reverse engineer" Microsoft's files, to recover your own content should you decide not to use Microsoft Office anymore. Sorry!
2. You can upgrade only three or fewer hardware components in your computer at a time without invalidating your Microsoft Office license. If you do very substantial hardware changes to your computer, you may need to re-register Office with Microsoft. Sorry!
3. If you purchased a computer that was pre-loaded with Microsoft Office, meaning that you have a legal OEM-licensed copy of Office, you cannot install that copy on any other computer. An OEM copy is forever married to the computer on which it was originally installed. You cannot move its hard drive to another computer and legally continue to use Office. Sorry!
4. You own only the physical storage media for Microsoft Office—CDROMs and some paperwork. You don't own the content (intellectual property) contained on those CDROMs. Instead, Microsoft owns the content, and, legally speaking, they have very tight control over what you can or cannot do with it. Sorry!

5. You cannot install Microsoft Office on more than one computer. Sorry!
6. If you purchase an Upgrade Version of Microsoft Office, it can be installed only on one computer on which your legally purchased older version of Office has already been installed. Sorry!
7. You cannot install an "OEM" version of Microsoft Office on any computer, unless you are an OEM (Original Equipment Manufacturer). Not even if you paid hard cash for that OEM version, from a bona fide company. Sorry!
8. You cannot give your legal OEM-licensed copy of Microsoft Office to anyone else. An OEM copy is forever married to just one computer. Sorry!
9. You cannot give your Upgrade Version of Microsoft Office to someone else. It's *your* Upgrade Version, to be used only by *you* to upgrade *your* original purchased copy. Sorry!
10. If you purchased a computer that was pre-loaded with Microsoft Office, meaning that you have a legal OEM-licensed copy of Office, be aware that Microsoft provides no support for OEM copies. Instead, you must take the matter up with your computer's vendor. Sorry!

Enough said?

5.4 Free as in Beer, Free as in Speech

Forget Microsoft Office, because a better choice exists: *OpenOffice*.

According to its web site, OpenOffice is compatible with other major office suites, but is free to download, use, and distribute for any purpose (business or personal). OpenOffice runs on both Windows and Linux.

5.5 Components

OpenOffice includes these component applications:

Writer is a word processor you can use for anything from writing a quick letter to producing an entire book. It is similar to Microsoft Word.

Calc is a powerful spreadsheet with all the tools you need to calculate, analyze, and present your data in numerical reports or sizzling graphics. It is similar to Microsoft Excel.

Impress is the fastest, most powerful way to create effective multimedia presentations. It is similar to Microsoft PowerPoint.

Draw lets you produce everything from simple diagrams to dynamic 3D illustrations.

Base lets you manipulate databases seamlessly. Create and modify tables, forms, queries, and reports, all from within OpenOffice. It is similar to Microsoft Access.

Math lets you create mathematical equations with a graphic user interface or by directly typing your formulas into the equation editor.

5.6 Features

All OpenOffice applications feature "one-click" export to PDF—a very handy feature.

OpenOffice is easy to use because it looks and feels familiar, and is instantly usable by anyone who has used a competitive product. It's easy to change to OpenOffice—the software reads and writes all major competitors' files.

OpenOffice is free software. You may download OpenOffice completely free of any licence fees, install it on as many computers as you like, use it for any purpose (private, educational, government. public administration, or commercial), pass on copies free of charge to family, friends, students, employees, etc.

5.7 Who Owns Your Data?

You may be wondering if OpenOffice locks your documents into proprietary file formats, making OpenOffice no better than Microsoft Office. The answer is NO—unless you choose to save your work using the DOC, XLS or PPT file format!

OpenOffice is the first software package in the world to use the OASIS OpenDocument Format (ISO 26300) as its native file format. No one owns that file format, and it's clearly documented so that anyone can write software to read or write that format without infringing on any patents.

5.8 Getting OpenOffice

Some Linux Live CDs include OpenOffice, which makes it very easy to evaluate without risk.

Or, you can download OpenOffice directly from its web site: http://openoffice.org .

Installing OpenOffice won't affect Microsoft Office. You can even have both running at the same time (as long as you don't try to use both at once to edit the same document!).

Part 6

Lagniappe

"We picked up one excellent word—a word worth traveling to New Orleans to get; a nice limber, expressive, handy word—'lagniappe.' They pronounce it lanny-yap. It is Spanish – so they said... It is the equivalent of the thirteenth roll in a 'baker's dozen.' It is something thrown in, gratis, for good measure".
—Mark Twain, "*Life on the Mississippi*"

Engineers and computer "geeks" love useful and interesting tools, and so you will find that many Linux distributions include a good assortment of these.

Here is a brief overview of some of the hundreds of *free* software tools that are commonly included with Linux—or that can be easily found and installed.

6.1 GIMP: Graphics

The GNU Image Manipulation Program (GIMP) is used for such tasks as photo retouching, image composition and image authoring. The front cover artwork for this White Paper was produced with the GIMP. This author has been using the GIMP for many years and highly recommends it. Note that the GIMP runs on both Windows and Linux. Web site: http://www.gimp.org

6.2 K3b: CD Burning

K3b is a popular CDROM/DVD "burner" for Linux that this author has been using for about a year. You can create data disks, audio disks, video disks, mixed-mode disks and eMovix disks. You can rip audio tracks from CDs, and burn disks from ISO image files. Web site: http://www.k3b.org

6.3 Scribus: Desktop Publishing

According to its web site, Scribus is an award-winning, professional page layout (desktop publishing) application that runs under Linux and Windows. Scribus features "press-ready" output and uses new approaches to page layout. Underneath the modern and user-friendly interface, Scribus supports professional publishing features such as CMYK color, separations, ICC color management and versatile PDF creation. Web site: www.scribus.net

6.4 Nmap: Network Scanner

Nmap ("Network Mapper") is a well-known utility for network exploration or security auditing, and is highly recommended by this author. It was designed to rapidly scan large networks, although it works fine against single hosts. Nmap uses raw IP packets in novel ways to determine what hosts are available on the network, what services (application name and version) those hosts are offering, what version of which operating system they are running, what type of packet filters/firewalls are in use, and dozens of other characteristics. Nmap runs on most types of computers, including Linux and Windows. Web site: http://insecure.org/nmap

6.5 Wireshark: Network Analyzer

Wireshark (formerly called Ethereal) is the world's foremost network capture utility and protocol analyzer. It is the standard in many industries and has been

used professionally by this author for several years now. Wireshark can recognize more than 800 protocols, including VOIP, HTTP, FTP, Ethernet, IEEE 802.11, PPP/HDLC, ATM, Bluetooth, USB, Token Ring, Frame Relay, FDDI, and others. Wireshark includes decryption support for many protocols, including IPsec, ISAKMP, Kerberos, SSL/TLS, WEP, and WPA/WPA2. Output can be viewed on-screen, or exported to XML, PostScript, CSV, or plain text files. Web site: http://www.wireshark.org

6.6 KHexEdit: Binary File Editor

KHexEdit is a Linux-only editor for the raw "binary" data contained in disk files. It will let you view and edit every byte of data in any file. Data can be displayed in hexadecimal, decimal, octal, binary or text formats. KHexEdit includes find and replace functions, bookmarks, many configuration options, drag and drop support and other powerful features. Web site: http://home.online.no/~espensa/khexedit

6.7 KWrite and Kate: Syntax-highlighting Text Editors

Most Linux distributions include several text editors. Kate and KWrite are two popular editors that automatically "colorize" text files being displayed, according to the file's content. More than 120 text formats are automatically recognized, including popular programming languages like C/C++, Java and Javascript, as well as markup such as HTML and XML. Once you've worked with a syntax-highlighting text editor you'll never go back to the likes of Notepad! Other features of Kate or KWrite include window tabbing; spell checking; file compatibility with DOS, Mac, Unix and Windows; support for UTF-8, UTF-16, ASCII and others; regular expression based find & replace; bracket matching; code and text folding; infinite undo/redo support; block selection mode; auto indentation. Web site: http://kate-editor.org

6.8 KSnapshot: Screen Grabber

KSnapshot is a versatile Linux application for taking screenshots. It is capable of capturing images of the whole desktop, a single window, or a selected region. The images can then be saved in a variety of formats, including JPG and PNG. Web site: http://docs.kde.org/stable/en/kdegraphics/ksnapshot

6.9 KCalc: Scientific Calculator

KCalc is a desktop calculator for Linux. It offers functionality offered by most hand-held scientific calculators, including trigonometric functions, logic (Boolean) operations, statistical functions. KCalc features a results-stack which lets you conveniently recall previous results. You can configure KCalc's display colors and font, plus its numeric precision and the number of digits after the decimal point. Built-in constants such as the speed of light are a mouse-click away. Web site: http://docs.kde.org/stable/en/kdeutils/kcalc

6.10 KStars: Astronomy

KStars lets you explore the night sky. It provides an accurate real-time graphical representation of the sky for any date, from any location on Earth. The display includes 126,000 stars, 13,000 deep-sky objects, all planets, the Sun and Moon, hundreds of comets and asteroids, the Milky Way, and 88 constellations. Pop-up menus link to informative web pages and beautiful images taken by the Hubble Space Telescope and other observatories. Web site: http://docs.kde.org/stable/en/kdeedu/kstars

6.11 TEX, LATEX and LYX

TEX, LATEX and LYX are components of a document preparation system used for high-quality typesetting. These components are widely used by mathematicians, scientists, philosophers, engineers, and scholars in academia and the commercial world. These components are definitely not for beginners who are accustomed to "dumbed down" applications. An example of what TEX, LATEX and LYX can produce is in front of you right now, for these components are used by this author to create his White Papers. Web sites: http://www.latex-project.org and www.lyx.org

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