

DNS/e-mail Solutions Guide

SOLUTIONS GUIDE

A Step-by-Step Solution Implementation

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1. Welcome to this Solutions Guide

Solutions Guides are published from time to time by Caldera Systems in an effort to foster greater understanding of specific solutions that are available with Caldera's OpenLinux software. Solutions Guides will help eSPs, eSolutions Providers (VARs, systems integrators, and large corporate technology specialists) come "up to speed" faster, thereby helping them to generate more solutions-based revenues.

Caldera Systems makes available a wealth of information for eSPs, including the following:

- Hardcopy Product documentation
- Online Knowledge Base
- Online documentation with the product
- Linux HOWTOs, from Linux Documentation Project
- Product support via e-mail and, in most cases, telephone support
- Caldera Press provides in-depth documentation on a wide variety of topics

Additionally, Caldera Systems cooperates with dozens of authors, providing the latest in software and support so that the third-party books they publish will be as current as possible.

Here are the types of documents we produce for the channel:

Solutions Guides focus on specific "cookbook", recipe approaches to solving specific problems.

White Papers focus on broad marketing issues, and on corporate philosophies.

Blue Papers (a new concept here, patterned after IBM's RedBooks, Red Papers, and Redpieces) focus on broad introductions to technology solutions. Not to be confused with Solutions Guides, these documents describe "why" a technology would be implemented; whereas, Solutions Guides focus on "what" to do to implement them.

Topics for Solutions Guides are suggested by on-going research at Caldera Systems, as well as by third-party research indicating the most likely technologies that will be deployed over the next few months. Some of the third-party sources include:

- IDC
- Forrester Research
- Gartner Group
- Dataquest
- VARBusiness
- Survey.com
- Sm@rt Reseller
- TechRepublic

The purpose of Solutions Guides is, simply, to enable eSPs to generate revenue quickly and easily, using a step-by-step approach to deploying Linux and Internet infrastructure technologies.

Solutions Guides, as a rule, are available only to Caldera Solution Partners. Occasionally, however, we make some of the Guides more generally available.

1.1. Introduction

Section One of this Solution's Guide introduces the reader to its focus and purpose. Here, you will be directed to additional resources that relate to this topic, learn where you can give feedback concerning the effectiveness of this Solutions Guide, and learn of any hardware or software prerequisites for implementing this solution.

Solutions Guides provide a "cookbook" approach to implementing real-world solutions in a minimum of time. Designed to eliminate much of the "learning curve" that accompanies new or different technology, Solutions Guides provide a step-by-step learning and doing experience.

Section Two begins a description of the implementation steps for this solution.

Appendix 7. includes an Evaluation Form, which we would appreciate your returning to us with your comments. See Section 1.6. "Evaluation Form" on page 12.

1.2. Executive Overview

This is a step-by-step guide to the configuration of DNS and e-mail services for OpenLinux eServer ver. 2.3. The assumption is that the user need not be a guru-status Linux sysadmin, but does have some familiarity with basic operations. Examples of using the command line in a terminal session will be given, as well as the use of the GUI-based tools that ship with eServer. The focus will be on starting with a new eServer install, right off the CD, with only perhaps a minimal degree of networking configured.

This section will not address network design in any great detail. The aim is to illustrate the use of various configuration tools, and the examples used will be simple ones. In part this discussion will mirror that in the eServer System Administrator's Guide that shipped with the eServer CD. At times the operation of the Webmin graphical admin tool will be discussed. Although it may seem paradoxical in a document devoted to a Linux server package, the position taken here—in general— will be that the best number of servers to run is the fewest that will meet the needs of your users. To this end a certain amount of "re-education" of users may be in order. Connecting a server to the Internet amounts to leaving a front door unlocked twenty four hours a day seven days a week.

1.3. To the Reader

1.3.1 Level of Understanding

The system administrator charged with responsibility for an eServer installation ought to understand the basics of TCP/IP networking, and have a firm grasp of the design and intended use of the networks that will be involved. Since network design and the functioning of TCP/IP are not Linux-specific topics, the admin need not be an

accomplished Linux expert, but ideally will have had some experience in multi-user, networked computing, perhaps on other operating systems.

eServer features user-friendly graphical tools to aid the initial setup, and many of the routine maintenance chores associated with a network server. This Guide will encourage the user to explore the use of the command line, as much of the flexibility and power of the Linux operating system can only be accessed in this fashion. In particular, the inevitable troubleshooting and fine-tuning of a network is attacked most efficiently from the command line, so any experience in using terminal based shells will be a definite plus.

1.3.2 Date of Publication and Version

The date of this published version and the version number appear on the cover page of this Solutions Guide.

Version numbering follows industry conventions. The whole number (to the left of the decimal) indicates a first major release of the document, if 1. If higher than 1, it indicates a new-total rewrite. Decimal fractions (numbers to the right of the decimal) indicate minor changes or tweaks.

1.3.3 Related Publications

The user should become familiar with the resources available at the Linux Documentation Project (<http://www.linuxdoc.org>), known as the "LDP." In addition to specific "How-To" documents that treat a wide range of topics there are several full length texts available. In particular, the following are recommended:

- The Linux System Administrators' Guide by Lars Wirzenius and Joanna Oja
- The Linux Network Administrators' Guide by Olaf Kirch
- DNS-HOWTO
- Mail-Administrator-HOWTO
- Mail-User-HOWTO
- NET3-4-HOWTO

- The LDP site is widely mirrored, so finding a handy nearby mirror will make life easier.
- There are full length printed books covering these topics, but the pace of change in Linux networking is such that some of the information may be out of date. Nevertheless these (all from O'Reilly) are recommended:
- TCP/IP Networking Administration by Craig Hunt
- Practical Unix and Internet Security by Simson Garfinkel and Gene Spafford
- Running Linux by Matt Welsh and Lar Kaufman

The proverbial “bottom line” to finding sources of information about Linux networking is: subscribe to mailing lists and read newsgroups! One consequence of the Free Software movement (sometimes termed “Open Source”) is that the entire business of finding and using help has gone through a complete paradigm shift. It is now an interactive community-based effort involving active participation, and this may require some new habit formations if one has been accustomed only to talking to 800 number help desks. Some may even find this a difficult troublesome change, but the water's fine...come on in!

1.3.4 Where to Turn for Additional Help

For additional assistance, beyond what is found in this Solutions Guide, you may consult Caldera’s Knowledge Base:

<http://support.calderasystems.com/caldera>

Installation support is available for 30 days from product registration, at:

<http://www.calderasystems.com/support/programs/installation.html>

Registered eSPs may find additional support in the Reseller Lounge at:

<http://www.calderasystems.com/private/hidden/locked>

General Linux questions may be answered by consulting these Web site resources:

Web Site	Description
http://netllama.ipfox.com/COL_FAQ.html	The alt.os.linux.caldera FAQ page
http://www.calderasystems.com/LDP/HOWTO/index.html	Documents which describe in detail various aspects of configuring or using Linux
http://www.google.com/linux	The Google search engine, pared down to include only Linux-related topics
http://www.deja.com/bg.xp?level=comp.os.linux	A searchable interface for the comp.os.linux Usenet newsgroup
http://www.cs.utexas.edu/users/kharker/linux-laptop/	Linux on Laptops website, a clearinghouse for information about installing laptops, indexed by manufacturer and model
<code>file:/usr/src/linux/Documentation/sound</code>	A directory on your system containing valuable information about making sound work in Linux. Articles are separated by module name, with a file called Introduction providing, rather predictably, an introduction to sound in Linux
http://www.alsa-project.org/~goemon/	ALSA Soundcard Matrix, a source for determining sound card compatibility in Linux
http://www.xfree86.org/	Homepage for XFree86, a non-profit organization that produces XFree86, the most popular X window system in the Linux community
http://glide.xedgex.com/	And excellent resource for information about 3D graphics in Linux
http://www.o2.net/~gromitkc/winmodem.html	Winmodems are not modems webpage, home of the Linux/Modem Compatibility Knowledge Base
http://gatekeeper.picante.com/~gtaylor/pht/printer_list.cgi	Printing HOWTO Support Database, including a searchable list of printers known to work with Linux and links to the necessary software
http://cesdis.gsfc.nasa.gov/linux/drivers/	Linux Network Drivers site

Web Site	Description
http://us2.samba.org/samba/oreilly/using_samba/	A full-text version of the O'Reilly book Using Samba.
http://stommel.tamu.edu/~baum/linuxlist/linuxlist/	Linux Software Encyclopedia, featuring an extensive list and description of software available in Linux
http://www.cablemodeminfo.com/linbasics.x.html-ssi	A resource for getting cable modems working in Linux
http://www.mostang.com/sane/	Homepage for SANE, Linux scanner software
http://www.Webmin.com/	Homepage for Webmin, a browser based administration utility for Linux
http://pcmcia.sourceforge.org/	Linux PCMCIA Information Page, a page about the PCMCIA services package
http://www.uruk.org/orig-grub/	Documentation about GRUB, the Grand Unified Bootloader
http://www.gnu.org/software/grub	Additional GRUB documentation
http://www.igd.fhg.de/~aschaefer/fips/	Documentation for fips, an open source partition resizing tool for Linux
http://www.wps.com/dead-media/	Homepage for the Dead Media Project, a compilation of historical information about dead media
http://www.worldvisions.ca/~apenwarr/apmd/	Homepage for the Linux Advanced Power Management daemon
http://www.ltspp.org/	Home to the Linux Terminal Server project, a project providing information about running diskless workstations in Linux
http://www.sun.com/software/linux/resources/staroffice.html	Staroffice information and downloads

1.4. Acknowledgements

The author would like to thank the founders of the Free Software movement for the wonderful community made possible by their untiring efforts. He has also been helped over the years by countless Linux users who have generously shared their experience and unflagging sense of humor!

1.5. Hardware and Software Requirements

1.5.1 Hardware Requirements

The author tested all the procedures discussed in this Guide on a Pentium 166 with 64 MB of ram, utilizing roughly half of a partition of about two GB. Apart from storage requirements, the hardware needs of a DNS/email server are not as rigorous as those required by some of the other packages available on eServer.

1.5.2 Operating System Software Requirements

This Guide was written using eServer version 2.4, which ships with Linux kernel version 2.2.14.

1.5.3 Additional Software Requirements

All the programs discussed in this Guide (with one minor exception) are available on the eServer 2.4 distribution CD, and on Caldera Systems' ftp site.

1.6. Evaluation Form

We desire that our Solutions Guides be as helpful as possible. Your feedback is very important to help us maintain the quality of our Solutions Guides. Please complete the evaluation form, found on Section 7. "Evaluation Form" on page 59, and return it to us using one of the following methods:

- Mail it to the address shown on the form
- Give it to Caldera marketing representative for mailing

- Fax the evaluation form. The fax number is shown on the form
- Send an e-mail note with your comments to solutions@calderasystems.com
- Complete the on-line evaluation form, found at <http://www.calderasystems.com/solutions/eval>

2. Profitability Worksheet

All successful businesses generate revenue and incur expenses. Since it's the mission of the company to generate revenue with its own goods or services, an eSP's function is generally to decrease expenses of business processes.

Depending upon the company, business processes may be in these areas, for example:

- Workflow—the movement of knowledge and documents, or finished or unfinished goods within the company
- Data Processing—accounting processes are always required, but there are others. Most technology spending in companies for data processing, though there are some exceptions.
- Sales Generation—including prospecting costs, lead management, and order fulfillment

The successful (profitable) eSP will learn to identify areas where expense can be reduced or eliminated. A dollar saved the client is a dollar that goes directly to the bottom line. Successful eSPs also learn to identify processes that lead to revenue generation as well.

With the growth of the Internet, most business managers are looking to Web-based eBusiness to provide additional revenue streams. Companies that have had traditional storefronts or distribution systems that expand to the Web are said to be combining "clicks" with "bricks."

Caldera's mission is to enable the development, deployment, and management of Linux-based specialized servers and Internet access devices that extend the eBusiness infrastructure.

2.1. Revenue Generation

Revenue is generated by eSPs in a number of ways, including these:

- Resale of technology
- Deployment of technology
- Support services

- Custom Programming
- Consulting

The topic of this Solutions Guide was selected because of its broad interest among eSPs and customers. That interest translates directly into revenue; but only if the solution can be deployed quickly and supported easily.

2.2. Worksheets

Profit, as we all know, is what's left after expenses are subtracted from revenues. This worksheet provides a handy place for you to calculate your revenue by deploying this Solutions Guide at a customer site.

This worksheets look at only three variables:

- Hardware Costs
- Installation Charges
- Support Costs

The first worksheet is to calculate the profitability of the solution

A	Profitability Worksheet: Traditional Solution	a	b	c
1	Hardware/Software Costs			
2	Cost of Hardware charged to Customer			
3	Cost of Software charged to Customer			
4	Total Cost to Customer (line 2a+3a)			
5	Your Hardware costs for Solution			
6	Your Software costs for Solution			
7	Your Total costs for Solution (5a+6a)			
8	Your Profit from H/S Sale (4b-7b)			
9	Installation and Configuration Costs			
10	Amount charged to Customer			
11	Estimated Time to Install (in hours)			
11	Your Cost per hour to Install			
12	Your Total Installation Costs (7a*8a)			
13	Your Profit from Installation (10b-12b)			
14	Support Costs			
15	Amount charged to Customer per Year			
16	Estimated Time to Support per Year			
17	Your Cost per hour to Support			
18	Your Total Support Costs per Year (16a*17a)			
19	Your Profit from Support per Year (15b-18b)			
20	Total Profit from Traditional Solution			
21	Profit from Sale, Installation, Configuration, and Support (for one year) (8c+13c+19c)			

using traditional tools. The second is to calculate using Caldera

System solutions, with this solution's Guide. You should expect to see an increase in revenue by using Caldera's solution.

B	Profitability Worksheet: Caldera Solution	a	b	c
1	Hardware/Software Costs			
2	Cost of Hardware charged to Customer			
3	Cost of Software charged to Customer			
4	Total Cost to Customer (line 2a+3a)			
5	Your Hardware costs for Solution			
6	Your Software costs for Solution			
7	Your Total costs for Solution (5a+6a)			
8	Your Profit from H/S Sale (4b-7b)			
9	Installation and Configuration Costs			
10	Amount charged to Customer			
11	Estimated Time to Install (in hours)			
11	Your Cost per hour to Install			
12	Your Total Installation Costs (7a*8a)			
13	Your Profit from Installation (10b-12b)			
14	Support Costs			
15	Amount charged to Customer per Year			
16	Estimated Time to Support per Year			
17	Your Cost per hour to Support			
18	Your Total Support Costs per Year (16a*17a)			
19	Your Profit from Support per Year (15b-18b)			
20	Total Profit from Caldera Solution			
21	Profit from Sale, Installation, Configuration, and Support (for one year) (8c+13c+19c)			
22	Value of the Caldera Solution (B21c-A21c)			

Factored in to the worksheet are other tangible or intangible considerations, such as:

- The customer's disposition toward change
- The increased learning required of the customer
- Whether or not the Caldera solution can be integrated into the customer's existing infrastructure

2.3. TCO Modeling

The profitability worksheets, in the previous section, are to a large degree, simplistic. A complete total cost of ownership (TCO) financial model should consider the following factors:

- Hardware acquisition and upgrade costs for all assets and new software license costs
- Management labor—Direct labor and contractor
- Support and overhead—upper management, help desk, purchasing, training, maintenance contracts and any other support and overhead costs
- Any application development labor and fees that are not line-of-business
- WAN communications—leased line, remote access services and others
- End-user IS support costs—the amount of time the end-users spend supporting the PC client/server infrastructure, based on the end-user salary
- Down time cost—based on the total downtime multiplied by the average end-user salary

2.4. Two TCO Models

There are two TCO models that are in wide use today:

- Direct hard-dollar costs, that include capital, expense, contact and/or labor
- Indirect soft-dollar costs, including time spent multiplied by the average end-user salary

Most complete TCO assessments, particularly if the customer requires it in the bid processes, will include both models.

3. Implementation Scenarios

Even a solitary standalone computer running Linux will generate some email, if only email it sends to itself to report on its internal housekeeping tasks. At the other end of the scale are dedicated email servers that send and receive substantial volumes of email traffic, routing some of that mail perhaps to an array of networks that are "internal" to a given organization, and some to hosts on the Internet per se. Depending on the decisions that have been made as to what sort of internal and external network presences an organization requires, eServer can be configured to provide users with email services anywhere along this spectrum of complexity. At a certain point this should involve the deployment of DNS services for that organization, as the smooth functioning of the mail system depends in turn on DNS.

Virtually the entire success of a server implementation hinges on the basic sanity of the network design. It is imperative that a clear, well considered conception of the networking needs of an organization be in place before proceeding to the installation of a server. That's the theory. In practice this almost never happens in real organizations, so the flexibility and extensibility of the Linux server platform will play a key role in the long term success of any project.

4. eServer 2.3 Solution Guide: DNS and Email

This is a step-by-step guide to the configuration of DNS and email services for OpenLinux eServer ver. 2.3. The assumption is that the user need not be a guru-status Linux sysadmin, but does have some familiarity with basic operations. Examples of using the command line in a terminal session will be given, as well as the use of the GUI-based tools that ship with eServer. The focus will be on starting with a new eServer install, right off the CD, with only perhaps a minimal degree of networking configured.

This section will not address network design in any great detail. The aim is to illustrate the use of various configuration tools, and the examples used will be simple ones. In part this discussion will mirror that in the eServer System Administrator's Guide that shipped with the eServer CD. At times the operation of the Webmin graphical admin tool will be discussed. Although it may seem paradoxical in a document devoted to a Linux server package, the position taken here—in general—will be that the best number of servers to run is the fewest that will meet the needs of your users. To this end a certain amount of “re-education” of users may be in order. Connecting a server to the Internet amounts to leaving a front door unlocked twenty four hours a day seven days a week.

4.1 First Considerations

Here are a few initial caveats and tips for configuring eServer. The following discussion will assume that the caveats are heeded. The tips are offered in the hope they will help make this interesting work a bit of fun too! All of this section will be old hat to experienced Unix and Linux users; it may be unfamiliar to others.

4.1.1 Don't log in as root!

During the installation of eServer a normal user account, someone other than "root," was created. Always log onto eServer as a normal user. These accounts can be created by using the COAS graphical tool:

K -> COAS -> System -> Accounts -> User -> Create user

When root privileges are needed for certain tasks, tools such as COAS and Webmin will prompt for the root password. Some find it convenient to open a terminal window and su to root. The main point is: Don't log in as root! The risks of leaving a server running with every process shown on the monitor having root privileges are impossible to calculate: the phone will ring, you'll be needed down the hall, and you'll walk away from the machine for...how long? Similarly, it's impossible to predict when a task will go awry, and if that task is executed with unnecessary root privileges then the results range from the trivial to the unrecoverable. Only do as root what must be done as root.

4.1.2 What time is it?

TIP: It may seem a point only purists would insist upon, but underlying the smooth functioning of the Internet is the assumption that everyone is looking at the same clock. If the time-stamp of email messages is incorrect your users will start complaining to you that their messages are getting "lost," meaning they are out of place on a list of messages that is sorted by date. For those of us who spend the better part of our working day traversing the Internet it is a serious breach of netiquette to persist in sending incorrectly time-stamped messages all over the globe. Standard operating practice in the Unix/Linux world is to set hardware clocks to UTC (aka Universal Coordinated Time, or what we used to call Greenwich Mean Time) and then tell the machine which timezone it lives in so that a calculation of the local time can be made. If your hosts are not set to UTC give serious thought to correcting that. For setting the hardware

clock a convenient source of UTC is <http://tycho.usno.navy.mil/what.html>. Once that is done the timezone in eServer can be set using COAS:

```
K -> COAS -> System -> Time -> [root passwd] -> Your  
time zone
```

A simple method for updating your clock is from the command line (as root):

```
# rdate -s tock.usno.navy.mil
```

rdate is not installed by default on eDesktop but an RPM is on the eDesktop binaries CD, and on ftp.caldera.com and its mirrors. The last thing you need while troubleshooting email is to have the eDesktop hosts on your network looking at the wrong time, so install rdate on them; you may have some aging hardware out there that will refuse to keep good time. The rdate program should not be used with any great regularity, because it creates an unnecessary load on the network, and on tock itself. eServer ships with the ntp network time synchronization package, and for networks of any decent size we suggest that this package be implemented.

4.1.3 Create an alias for root

It's important that you, the sysadmin, see mail the system generates regarding its operations. Typically this mail is addressed to root, but you should redirect it to your own account so you won't have to watch two mailboxes. Also, you will have one less root-privileged process running if you are not keeping an email client tied up reading root's mail.

Tidying up aliases is simple, and does not require a Webmin session. As root open the file `/etc/aliases` in an editor. Scroll down to the end of the file where you'll see the line `'#root col'` ("person who should get root's mail"). Uncomment it by removing the # sign and enter your normal user account name instead of col. Save the file and exit the editor and then from the command line run the command:

```
# newaliases
```

Now all of root's mail will find its way to your mail spool.

4.1.4 Backup system files before editing

Get in the habit of always making a copy of any system file you alter. An error introduced by your edits can have dire consequences; also, even though at the time it may seem impossible that you could ever forget what the original settings were in a given file, at times you will, and quickly! Be careful about naming backup copies. Some editors create their own backups by appending “.bak” to the filename, so avoid that technique. For system files in their initial condition after an installation is first completed you might consider appending “-orig” to the filename. Keep these copies in the same directory as their originals, and leave the beginning of the filename alone so that your copy will show up near the original in a file listing:

```
# cd /etc
# cp resolv.conf resolv.conf-orig
```

4.1.5 Get to know the command line

TIP: Along with the graphical tools provided by eServer the use of the command line will be discussed. The aim is to increase understanding of what's going on “under the hood;” also, some tasks can only be performed from a terminal session. In the KDE environment the best terminal emulator is konsole, which can be launched from the Utilities submenu in the “K” start menu. It's not a bad idea to add it to kpanel for quick access:

```
K -> Panel -> Add Application -> Utilities -> Konsole
```

Once launched, play with the Options menu of konsole, in particular the settings for Font, Size, and Schema. Don't forget to use “Save options” to retain your favorite settings.

4.1.6 Do you need these services?

For some installations, the need for DNS and email services can be met by the default configuration provided by eServer when it is first installed. Its “out of the box” settings are adequate for many situations, and—as noted above—it is not advisable to have a service

running if it is not really needed. Before proceeding give some thought to how you can meet the needs of your organization and network users with a minimal number of servers running "inhouse."

4.2 DNS

Domain name services provide mapping between Internet host names and their actual numeric IP addresses; they also provide information about "mail exchangers," those hosts on a given domain charged with routing email for that domain. Mail Transport Agents ("MTA"'s) such as Sendmail (the MTA used by eServer) expect to find a working nameserver. For example, in most dialup internet connections, the IP addresses of one or two nameservers maintained by the ISP are made available to the dialup client. Besides the functions just mentioned nameservers store the results of the queries they answer; they "cache" this information so that the next time it is requested they don't necessarily have to go out on the Internet to find it. This can greatly enhance the speed of network operations and cuts down on the volume of network traffic. For every registered Internet domain there must be two "authoritative" nameservers with bona fide Internet IP addresses; these are termed the primary and secondary nameservers for a given domain. Some nameservers are termed "caching only" since they do not serve to provide authoritative information for any network domain. These nameservers increase the efficiency of a network's operation and also store information about private networks that are not a part of "the" Internet.

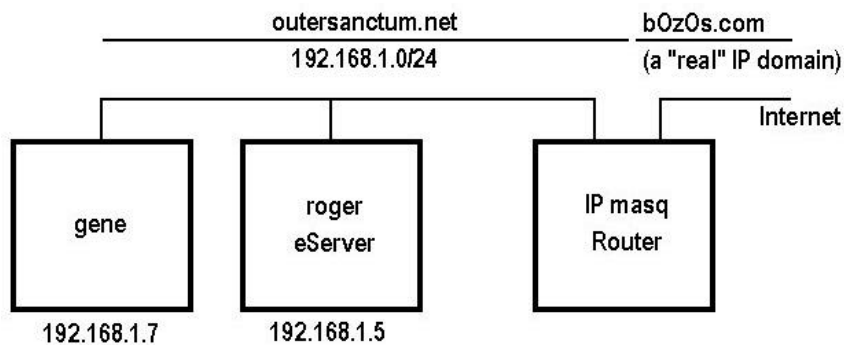
TIP: Required reading at this point should include:

- The DNS HowTo,
<http://www.linuxdoc.org/HOWTO/DNS-HOWTO.html>
- The Domain-Setup-mini-HOWTO,
<http://www.linuxdoc.org/HOWTO/mini/Domain.html>

These documents, and many others in the Linux Documentation Project (LDP), provide excellent introductions to their topics. Some will argue with certain details in each, but given the immense scope

and depth of the DNS system this is not surprising; even the experts diverge on some points. Find, bookmark and use a nearby LDP mirror!

This section will focus on the use of the Webmin graphical configuration tool. The simplest possible case will be used to demonstrate the use of this tool. Imagine you registered a domain "b0z0s.com" which currently has an Internet IP address and nameserver, including MX (mail) records. Suppose that eServer has been installed on a machine called roger on a private network (say, for example, 192.168.1.0/24, known as "outersanctum.net") that functions as part of b0z0s.com via access through a router to the Internet. Suppose further that the IP address of roger.outersanctum.net is 192.168.1.5. Also on this fictitious network will be another computer named gene:



The job will be to set up eServer on roger to take over the nameserver function for this private network. The nameserver will cache the results of DNS queries sent to the Internet, and will also answer DNS queries about the private network outersanctum.net. One outcome of this arrangement will be that eServer can then create an MX record for the private network, designating which host on outersanctum.net will handle local mail for the domain. (In actual practice you would

likely install eServer to function as the “Router” in the diagram, perhaps taking over as primary or secondary nameserver for the real domain “b0z0s.com”; this is just an imaginary example.)

TIP: The BIND daemon, `/usr/sbin/named` (pronounced “name-dee”), is not started at boot when eServer is first installed. This can be verified with the `ps` command:

```
#ps ax | grep named
2585 pts/1  S    0:00  grep named
```

Chances are a nameserver is specified in `/etc/resolv.conf`; this value would have been entered during the install of eServer.

Once the nameserver has been initialized and tested it can be configured to start automatically when eServer is booted.

4.2.1 Configuring named: step-by-step

This section should be read in conjunction with the eServer System administrator’s Guide. We will go into a little more detail, and correct a couple of errors in the Guide.

- 1** Launch Webmin by starting the Communicator browser and opening the URL `http://localhost:1000`. Since you didn't log on as root you will be prompted for a User ID and password. Enter 'root' for User and the root password. A normal user cannot monkey with named configuration files! Set a bookmark for this page.
- 2** Click on the link to “BIND 8 DNS Server”.
- 3** You will be told that no valid `named.conf` file exists and asked if you'd like to create one. (Figure 74 on page 119 of the Guide may not be what you see.) Of the three radio button choices, the second - which should already be selected as the default - is the one to use since this machine is, per our hypothetical case, already connected to the Internet. Go with that choice and click on the “Create Primary Configuration File...” button.

TIP: Two files, `named.conf` and `db.cache` were just created in the `/etc` directory. Take a look at these in a terminal window using, for example, the `less` command.

TIP: The copy of `db.cache` shipped with Webmin is out of date. Don't use it; if you must select Webmin's third button (“...use Webmin's older root server information.”) then replace it with a

current copy of `db.cache` ASAP. See the section below "Using the `h2n` script" for instructions for getting an up-to-date copy of `named.root`, which you will rename `db.cache`.

- 4 Now you must tell `named` about your network. Click on the "Create a new master zone" link. In the "Domain name/Network" box enter your network's name, in our case `outersanctum.net`. Roger's fully qualified domain name (FQDN) should already be in the "Master server" box, `roger.outersanctum.net`, indicating that `roger` will be the nameserver for this network. In the "Email address" box put `root@roger.outersanctum.net`, and make a mental note to set an alias for `root` in `/etc/aliases` so that mail regarding `named`'s operation will be sent to you. That's it; hit the "Create" button and you will soon be looking at a new link to your domain on the "Existing DNS Zones" Webmin page. Back in your terminal window look at `/etc/outersanctum.net.hosts`, which you (and Webmin) just created.
- 5 Now create a reverse lookup zone file for your network. Click again on "Create a new master zone" and be sure to click on the "Reverse" button at the top of the page. Now enter your network address, in our example `192.168.1`, in the "Domain name/Network" box and the same as before in the Email address box. (The Guide is less than clear that a numeric IP network address must be used for reverse zone files.) Click "Create" and then take a look at `/etc/192.168.1.rev`. The "rev" is for "reverse."
- 6 Now tell `named` about `roger`. Click on the link to "`outersanctum.net`" on the "Existing DNS Zones" Webmin page. To add `roger`'s address click on "Address," but only after noting the '(0)' next to that link; so far we have not created any address records. In the "Name" box enter "`roger`". (The Guide suggests that a FQDN be entered here; you can if you wish, but be sure to append a trailing period to it: "`roger.inner.sanctum.com.`"; this relates to the syntax of BIND's zone files.) Enter `roger`'s IP address in the "Address" box, in our case `192.168.1.5`. Check that the "Update Reverse?" is "Yes" and click "Create." For now, don't add any more address records but scroll down and click on the "Return to records" link. Now revisit the first two files that were created: `/etc/outersanctum.net.hosts` and `/etc/192.168.1.rev`. You should see the records for `roger` in them. Scroll down to the bottom of the Webmin page and click on "Return to zone list."
- 7 Click on "Apply Changes" at the bottom of the "Existing DNS Zones" page; `named` is now running, a fact you can verify with the `ps` command as noted above. But can we use `named` now? In a terminal enter the command: `nslookup` and see what it reports as "Default Server." It won't be `roger`, but the nameserver you entered during `eServer`'s install. In `/etc/resolv.conf` add the line "`nameserver 192.168.1.5`" above any other nameservers listed.

Ignore the "Do not edit." warning. (Did you make a backup of the original file before editing it?) If there is a 'search' line comment it out with the # sign, and check that a domain line exists. It should look something like this:

```
domain outersanctum.net
#search outersanctum.net
nameserver 192.168.1.5
```

Now go back and try nslookup. Success?

TIP: Test both forward and reverse lookups, and also a few internet addresses:

```
wingnut@roger:~> nslookup
Default Server: roger.outersanctum.net
Address: 192.168.1.5
> w3.org
Server: roger.outersanctum.net
Address: 192.168.1.5
Non-authoritative answer:
Name: w3.org
Address: 18.29.0.27

> 18.29.0.27
Server: roger.outersanctum.net
Address: 192.168.1.5

Name: tux.w3.org
Address: 18.29.0.27

> roger
Server: roger.outersanctum.net
Address: 192.168.1.5

Name: roger.outersanctum.net
Address: 192.168.1.5
```

```
> 192.168.1.5
Server:  roger.outersanctum.net
Address: 192.168.1.5
```

```
Name:    roger.outersanctum.net
Address: 192.168.1.5
```

The phrase "Non-authoritative answer" indicates that the data was returned from a caching nameserver other than either of the two authoritative nameservers for the host or domain that was queried. Thus if a result is provided without this phrase, and the same query is immediately repeated, then the phrase will appear indicating that your nameserver itself provided the data from its own cache. (In the example above data for w3.org was already in the nameserver's cache; the very first time you run and test your nameserver you should not see this phrase. Try it. This will not be the case if a "forwarder" is used, but we'll take that up below.)

- 8** At this stage we can return to Webmin and, following Step 6 above, create any needed additional address records, for example, one for "gene.outersanctum.net" with the address 192.168.1.7. Be sure to "Update reverse" records, and click on "Apply changes" on Webmin's "Existing DNS Zones" page when you're done.
- 9** One last step remains before leaving the DNS configuration. A mail (MX) record ought to be created for the domain outersanctum.net, and for each host on outersanctum.net so that mail delivery systems on the private network know which machine is acting as the mail host for mail addressed to anyone on outersanctum.net. Each host should be set to be its own mail host; typically one machine will serve as the mail host for the private network, and users on other hosts on the network will access that machine to retrieve their mail. In this example mail addressed to, say charles@outersanctum.net, will be delivered to charles' account on roger, but mail addressed to charles@gene.outersanctum.net will be delivered to his account on gene. This is just an example; the combination of named and sendmail is powerful and can be configured in an infinite variety of ways, some easier than others to understand and implement.

Starting at the "Existing DNS Zones" page, click on "outersanctum.net" and then on "Mail Server". In the "Name" box enter the domain name appending the mysterious period: "outersanctum.net.", then enter just "roger" in the "Mail Server" box. Enter the value "10" in the "Priority" box, indicating that roger is the primary mail host on outersanctum.net, and click "Create." On networks of

any decent size a second mail record would be created with a Priority "20" for a backup mail host to be used in case the primary was not available. Then create MX records for gene and roger, again entering just the machine names in the "Name" box. After creating this last record back out of Webmin making sure you press "Apply changes" before exiting. The file `outersanctum.net.hosts` will now look something like this:

```
outersanctum.net.      IN      SOA
roger.outersanctum.net.
root.roger.outersanctum.net. (
                            959318883
                            10800
                            3600
                            432000
                            38400 )
outersanctum.net.      IN      NS    roger.outersanctum.net.
outersanctum.net.      IN      MX    10
roger.outersanctum.net. IN      A     192.168.1.5
gene.outersanctum.net. IN      A     192.168.1.7
roger.outersanctum.net. IN      MX    10
roger.outersanctum.net.
gene.outersanctum.net. IN      MX    10
gene.outersanctum.net.
```

NOTE: Webmin chooses not to use a convention that is available to simplify zone file syntax, the "@" character. So, don't be surprised if you look at other zone files and notice they appear less cluttered than ours. The BIND documentation and the DNS-HowTo explain the use of @.

- 10** End the Webmin session by exiting the web browser. Don't leave any unnecessary root-privileged processes lying around. Also, if you start testing the mail delivery you'll find it's not quite yet ready.

4.2.2 Another nslookup Test

Let's see what nslookup can tell us about our private domain using our nameserver. First we'll ask for any records, then just the MX records:

```
[root@roger named]# nslookup
Default Server:  roger.outersanctum.net
Address:  192.168.1.5
```

```
> set q=any
> outersanctum.net
Server:  roger.outersanctum.net
Address:  192.168.1.5
```

```

outersanctum.net      nameserver =
roger.outersanctum.net
outersanctum.net
    origin = roger.outersanctum.net
    mail addr = root.roger.outersanctum.net
    serial = 959318883
    refresh = 10800 (3H)
    retry   = 3600 (1H)
    expire  = 432000 (5D)
    minimum ttl = 38400 (10h40m)
outersanctum.net      preference = 10, mail exchanger
= roger.outersanctum.net
outersanctum.net      nameserver =
roger.outersanctum.net
roger.outersanctum.net internet address = 192.168.1.5
> set q=mx
> outersanctum.net
Server:  roger.outersanctum.net
Address: 192.168.1.5

outersanctum.net      preference = 10, mail exchanger
= roger.outersanctum.net
outersanctum.net      nameserver =
roger.outersanctum.net
roger.outersanctum.net internet address = 192.168.1.5
> exit

```

A lot can be learned with nslookup.

4.2.3 Starting and stopping named

If you've just installed eServer then named is not started at boot time. This can be remedied now; start by clicking:

```

K -> COAS -> System -> Daemons -> [enter root passwd]
-> Ok

```

Scroll down the list and click on “Internet domain name server (named)”, then click OK. Before rebooting there's a nice little experiment you can perform now. On the command line (as root) run the following and observe the results:

```
# ls /var/lock/subsys/name*
# ps ax | grep named
# /etc/rc.d/init.d/named stop
# ps ax | grep named
```

Webmin does not currently set a lock file for named when it starts named; this will be remedied in subsequent releases. The init script checks for a lock file and will fail—silently—if one is not found. named was not stopped. The moral to this story is do not intermingle use of named's init script with a Webmin session unless you enjoy the occasional surprise.

On rebooting the system you can again try the above experiment. You'll note now that the init script tells you what's happening. To start named after it's been thus stopped, the obvious is what will work: `/etc/rc.d/init.d/named start`. The same, only with `restart` instead of `start`, is useful if you edit one of named's configuration files while it is running and want to apply the new configuration. It's helpful to examine the scripts in `/etc/rc.d/init.d` to understand the options for each daemon.

WARNING: Do not edit these init scripts without the permission of a Tibetan Linux Guru! Seriously, even if you think you know what you're doing (in itself not a good sign), find another way to do whatever it is you feel you must do without changing these scripts.

4.2.4 Using forwarders

One important named option cannot be configured using Webmin. These are “forwarders,” nameservers on remote sites that can provide your system a ready-made cache of DNS information. Chances are your ISP or connectivity provider made available the IP addresses of one or two nameservers on their network. Getting answers to DNS queries can be speeded up by telling your nameserver to query these

systems first before starting a search of the root nameservers (the ones listed in `db.cache`). The “forwarders” option is placed in `named.conf`, in the “options” block: (bogus numbers used here)

```
options {
    directory "/etc";
    pid-file "/var/run/named.pid";
    forward first;
    forwarders {
        12.345.67.89;
        12.345.67.90;
    };
};
```

Note how the syntax uses curly brackets and semicolons. The line `forward first;` instructs `named` to check the forwarders' caches first, before moving on in its search. Instead of `first`, the `forward` option can also take the keyword `only`, meaning that `named` will only use the forwarders.

TIP: Find and bookmark the BIND documentation on your hard drive: `/usr/doc/bind-8.2.2p4/html/index.html`

4.2.5 Using the `h2n` script

An alternative to Webmin

Prior to the development of the BIND system for name resolution huge `/etc/hosts` files had to be exchanged between all the computers on the then fledgling Internet. Chances are the format of `/etc/hosts` is more familiar to most than `named`'s zone files. The `h2n` utility, a `perl` script, automagically generates zone files from a hosts file. For a small straightforward network this approach can save time, as it avoids typos and syntax errors in the zone files that are produced.

The version of `h2n` that ships with `eServer` has been adapted to provide by default a set of files for version 8 of BIND, which is the version installed on `eServer`. Version 4 of BIND is still in widespread

use, but be aware that the syntax of its configuration files is quite different from that used by version 8. Suppose `/etc/hosts` on `roger` looks something like

```
127.0.0.1      localhost
192.168.1.5    gene.outersanctum.net  gene
192.168.1.7    roger.outersanctum.net  roger
```

We will use two options for `h2n` in our example, `'-d'` for Domain, the domain name of your network, and `'-n'` for Network, which is the network address without any trailing zeros. There are many more options which can be used with `h2n`; the man page lists them all with examples. Give `h2n` a try by creating a test directory out of the way and running `h2n` in it with the following arguments:

```
# cd /home/myusername
# mkdir h2n-test
# cd h2n-test/
# h2n -d outersanctum.net -n 192.168.1
```

Examine the resultant files. Either `named.conf` or `conf.cacheonly` can be copied into `/etc/named.conf` to serve as `named`'s configuration file, depending on what services you need. The latter will set up (after being renamed to `named.conf`) a simple caching only nameserver, and the system's resolver will continue to rely on `/etc/hosts` for access to the other machines on the network. Then copy the "db" files created by `h2n` to `/etc`. For the caching only setup only two of them will be needed. Be sure to edit the "directory" option in `named.conf` to point to `/etc`. The file `db.cache` can be found here: <ftp.rs.internic.net>; get the file `named.root` in the directory `/domain` and rename it `db.cache`. You'll find a version of `db.cache` on your hard drive but it is out of date. Finally, if you decide to use a caching-only nameserver, note that you must make the first nameserver in `/etc/resolv.conf` look like this:

```
nameserver 127.0.0.1
```

4.2.6 Where the files should be

Advanced fine tuning

It is inconvenient to have named's zone files scattered around the /etc directory; some might even argue it's wrong. Typically these files are in /var/named, or perhaps /etc/named. For the sake of keeping track of them it is advisable to move them into one or the other. Be sure to edit the "directory" option in named.conf (which must stay in /etc) to point to the new home of the zone files, and get rid of any other references in named.conf to /etc i.e. identify the zone files by their filenames only, without any directory paths. named understands that filenames in named.conf are relative to the value of the directory option.

4.3 Email

The default sendmail configuration shipped with eServer (and eDesktop) will be perfectly adequate for a large number of configurations. Some fine tuning is needed to adapt sendmail to a specific installation. For our imaginary network, outersanctum.net, these changes, with one exception perhaps, can be made using the Webmin browser tool. However the changes are so simple that (again, with that one possible exception) they can easily and quickly be made using a text editor.

Please read through completely this section before attempting to follow, or adapt, the configuration example. Some of the later material, left for the end because it's somewhat "technical," may bear on how you approach the beginning of this example.

4.3.1 Starting and stopping sendmail

The sendmail daemon (which is to say, in eServer, eDesktop and most Linux installations it's being run as a daemon) is controlled by the script /etc/rc.d/init.d/mta. Here "mta" stands for "Mail Transport Agent," which in our case is sendmail; there are other MTA's available for Linux, and the MTA script arrangement allows for changing one MTA for another with a minimum of systemic upheaval.

If you inspect the mta script you'll notice it takes three possible arguments. (Where system init scripts are concerned it is prudent to look at them to determine their arguments, rather than just running

them “blind” from the command line in the hope they will reveal their options in a purely benign fashion.) These options are “stop”, “start” and “reload”. Webmin will, when absolutely required, execute the mta script with the proper option after it changes certain configuration files, and it will do this in the background without bothering you about it. On the other hand, there are some changes that do not absolutely require stopping and restarting sendmail for them to be implemented. In keeping with this situation Webmin leaves you in charge. Note on the main Sendmail Configuration page the button which should now say “Stop Sendmail”. Click it and note that it toggles its message to “Start Sendmail”. As we suggested regarding named, you can check sendmail's status with “ps ax | grep sendmail” from the command line.

The bottom line to all this is summed in a statement found in the Sendmail FAQ: “IMPORTANT: When making changes to your configuration file, be sure you kill and restart the sendmail daemon (for any change in the configuration, not just this one).” In the original the emphasis was on the word any! You can see this at: <http://www.sendmail.org/faq/section4.html#4.5> The order of battle is:

```
stop sendmail -> make changes -> start sendmail
```

4.3.2 Configuring sendmail: step-by-step

These are the steps needed to configure sendmail on roger.outersanctum.net so that, in addition to proper delivery of mail addressed to remote sites on the Internet, local mail addressed (for example) to “charles@outersanctum.net” will be delivered to charles' account on roger, but that mail addressed, say, to “mambo@gene.outersanctum.net” will be delivered to mambo's account on gene. This discussion assumes that named on roger has been configured as described above, and that gene has been told to use roger as its first nameserver in /etc/resolv.conf.

- 1 Edit /etc/sendmail.cf (after making a copy of it for safekeeping).

Comment out the line beginning with "FR-0" and rewrite it below so that the block looks like this:

```
# Hosts that will permit relaying
# FR-0 /etc/mail/relay-domains
FR-0 /etc/sendmail/relay-domains
```

With changes of this sort it's handy to be able to see what was in place before your edit. The problem here is that eServer's location for files such as relay-domains is /etc/sendmail; there is no /etc/mail directory and Webmin does not alert you when it fails to write the file. You would notice when returning to "Relay Domains" that anything you entered there has disappeared. More on this below.

- 2 Open a Webmin session in your browser and click on "Sendmail Configuration". Then click on "Stop Sendmail".
- 3 Click on "Local Domains." Enter the following in the edit box:
outersanctum.net
roger.outersanctum.net
- 4 Click on "Save", ignoring for now Webmin's suggestion that you need not enter "roger.outersanctum.net" in this box. Now, in a terminal window look at the contents of /etc/sendmail.cf. That's the file that Webmin altered.
- 5 Click on "Relay Domains" and enter the following in the edit box:
roger.outersanctum.net
gene.outersanctum.net
Click "Save". Take a look at the file /etc/sendmail/relay-domains.
- 6 Click on "Domain Masquerading". In "Masquerade as domain" enter "b0z0s.com". You want all mail to appear to be sent from your actual registered domain. (There may be need to refine this issue later.) Leave the other edit box empty and click "Save". Take a look at /etc/sendmail.cf and note the line that begins with "DM".
- 7 Restart sendmail.
- 8 Exit the browser completely to kill the root privilege session.

Assuming you've created some user accounts on gene and roger you can start testing mail delivery.

4.3.3 The "From: "problem

One of the drawbacks of our simple imaginary network is that some mail delivered by it to Internet destinations will fail delivery. Even though we set "Domain masquerade" to our bona fide registered domain "b0z0s.com," some mail hosts on the Internet exercise more stringent reverse checks on the source of incoming mail than others, and in all likelihood you will find that mail to some hosts will be bounced back to you with the disheartening news that `outersanctum.net` is a nonexistent domain. This may not be an issue with some, perhaps many, actual networks in which the FQDN of every machine reflects an actual, resolvable domain. However, at some point every network must come to grips with the question of how to handle outgoing mail so that local mail gets delivered locally, and remote mail is sent out in a form that ensures its proper delivery.

Sendmail is rich with features that allow endless variations on the solution of this question. For our imaginary network the "masquerade_envelope" feature is the simplest road to success. It requires that `/etc/sendmail.cf` on each host (in our example `gene` and `roger`) be rebuilt so that "domain masquerade" takes on a different, stronger, meaning. (Actually, the file need only be rebuilt once, and then copied to each machine for final tuning.) As noted, there are other sendmail features some combinations of which will give a workable solution, such as "mail_hub" and "smart host". The solution offered here has the virtue of simplicity. With `masquerade_envelope` the entire email "package," so to speak, of a given message is shown as coming from the masquerade host. This is different than simply rewriting the "From: "headers contained within the message. From: headers are easy to adjust within most mail user agents, such as Mutt or Communicator.

4.3.4 Fine-tuning `sendmail.cf`

Some features of sendmail can only be activated by recreating the `/etc/sendmail.cf` file that ships with eServer; `masquerade_envelope` is one of these. This is not the dark mystery it may appear to be at first glance. There are many sendmail features you might some day have need for, so rebuilding `sendmail.cf` ought to be learned and that's

easy enough. (You'll notice that if you click on some of the icons on Webmin's Sendmail page that the feature you selected is "not available," indicating that sendmail.cf needs to be rebuilt.) A good reference to sendmail's features, including its several forms of masquerading, is <http://www.sendmail.org/m4/features.html>.

In basic outline here are the steps to implement this feature, along with their command line execution:

- 1** Open a terminal window and su to root.
- 2** Save a copy of /etc/sendmail.cf for future reference.
- 3** Go to /usr/share/sendmail/cf/cf and make a copy of generic-col2.2.mc for your changes. Call it anything you like (roger.mc) but retain the ".mc" suffix.
- 4** Edit your new ".mc" file and set the masquerade_envelope feature: after opening the file in your editor append the needed lines (including a comment, to remind you where the lines came from) to the end of the file:

```
dn1 # My stuff
MASQUERADE_AS(b0z0s.com)
FEATURE(masquerade_envelope)
```

- 5** Using sendmail's m4 macro facility and Makefile, generate a new sendmail.cf file.
- 6** Copy the new file to /etc and restart sendmail.

Here are the command line steps. Take note of the directory names, as they are somewhat counter-intuitive!

```
# cp /etc/sendmail.cf /etc/sendmail.cf-orig
# cd /usr/share/sendmail/cf/cf
# cp generic-col2.2.mc roger.mc
# emacs roger.mc
# make roger.cf
# cp roger.cf /etc/sendmail.cf
# /etc/rc.d/init.d/mta stop
# /etc/rc.d/init.d/mta start
```

Don't forget to fix the relay-domains directory problem in your new sendmail.cf. That, and the value of "masquerade_as" are the only tweaks that our example requires in sendmail.cf. With the new file in place and sendmail restarted testing can begin in earnest. This testing

can utilize any of the three MUA's (Mail User Agents) that ship with eServer and eDesktop: mutt, kmail, and Communicator. For the most part the only configuration needed by these is the specification of the user's name and email address, the latter being what the MUA will place in that From: header we've already considered in depth from the point of view of configuring sendmail. Of the three, mutt can be used "out of the box" with no configuration at all, so this powerful terminal-based MUA may be the best choice for testing. kmail and Communicator will each ask you to spend some time configuring "accounts" before they are ready to use, but that is the subject of the next section.

4.3.5 Getting and Reading the mail

We have concentrated so far on mail delivery, or "sending" as it's popularly known. Now we turn to the other side of the mail equation, retrieving, reading and composing mail messages. eServer ships with two mail retrieval servers ready to go with no configuration needed; these are the POP and IMAP servers: ipopd and imapd. The system administrator should decide which of these to implement, and disable access to the other for security reasons. (More on that later.) Note that if remote mail servers are going to be accessed then mail clients will have to be chosen in accordance with what services these remote servers provide. Both Communicator and mutt have IMAP support; the version of kmail currently shipping with eServer and eDesktop has none. All three MUA's have onboard POP support, but if POP is the protocol then fetchmail is the answer.

4.3.5.1 fetchmail: The Archetypal Category Killer

Fetchmail does one thing and does it better than anything else, hence the term "category killer." It is the gold standard of POP clients. Give serious consideration to configuring fetchmail on all your machines for all your users. It is infinitely configurable. It can talk to IMAP servers. It can run in the background and periodically poll mail servers (hence, there's no need for a cron job). With the KDE desktop a simple arrangement of panel buttons or menu items can be created that will call fetchmail with any number of different configurations,

such as for multiple remote POP accounts. Either Communicator or mutt (both of which, granted, have their own POP support) will work well with fetchmail.

Here are the steps for creating a basic fetchmail configuration: fetchmail expects to find a configuration file named `.fetchmailrc` in the home directory of the user who invokes fetchmail. It's useful to work with a sample configuration file provided in fetchmail's documentation because it includes all of the configuration possibilities. To create a user's `.fetchmailrc`:

- 1 As a normal user copy `/usr/doc/fetchmail-5.0.4/sample.rcfile` to that user's home directory as `.fetchmailrc`:

```
$ cd  
$ cp /usr/doc/fetchmail-5.0.4/sample.rcfile  
  .fetchmailrc
```
- 2 Change the permissions of the file (without these permissions fetchmail will - rightly - refuse to operate):

```
$ chmod 600 .fetchmailrc
```
- 3 Now edit `.fetchmailrc`. You will first want to remove everything below the line that begins "`# This is what the developer's...`".
- 4 Uncomment and provide appropriate arguments for the keywords "`poll`", "`protocol`", and "`password`". Be sure to either move the `#` to the right of the values you provide, or delete everything to the right of your values. Note that if the user's name on the remote server being polled is the same as on the local account then it need not be specified.
- 5 Uncomment the keyword "`fetchall`", save your changes and exit the editor.
TIP: `grep -v '^#' .fetchmailrc` from the command line to see if everything appears reasonably legal.
- 6 At this point you can run `'fetchmail --version'` from the command line and read the interesting output. It will look something like this:

```
Linux hoopla.ruptured-duck.org 2.2.14 #1 SMP Fri Nov 19  
09:14:07 MST 1999 i586 unknown  
This is fetchmail release 5.0.4
```

Taking options from command line and `/home/charles/.fetchmailrc`

```
Idfile is /home/charles/.fetchids
```

Fetchmail will forward misaddressed multidrop messages to charles.

Options for retrieving from charles@pop.somepopserver.com:

```
True name of server is pop.somepopserver.com.
Protocol is POP3.
Server nonresponse timeout is 300 seconds (default).
Default mailbox selected.
All messages will be retrieved (--all on).
Fetched messages will not be kept on the server (--keep
off).
Old messages will not be flushed before message
retrieval (--flush off).
Rewrite of server-local addresses is enabled (--
norewrite off).
Carriage-return stripping is disabled (stripcr off).
Carriage-return forcing is disabled (forcecr off).
Interpretation of Content-Transfer-Encoding is enabled
(pass8bits off).
MIME decoding is enabled (mimedecode on).
Nonempty Status lines will be kept (dropstatus off)
Messages will be SMTP-forwarded to: localhost (default)
Recognized listener spam block responses are: 571 550
501
Single-drop mode: 1 local name(s) recognized.
No UIDs saved from this host.
```

To actually fetch the mail, just run `fetchmail` on the command line. Note the effect of activating the keyword `'fetchall'`; this causes `fetchmail` to retrieve both old and new mail. In the output above this is indicated by the line ending with `"(--all on)"`. The `fetchmail` man page gives detailed descriptions of all the keywords present in `.fetchmailrc`.

By varying the use of keywords it is easy to set up a configuration in which, say, only new messages are fetched but they are left on the server, so that users could get their mail throughout the day at one machine and then later grab all of it at another. `Fetchmail` creates standard mail "spool" files such as, in our example, `/var/spool/mail/charles`. `Mutt` will automatically look for this file. `Communicator` will show this file in its list of folders.

4.3.5.2 Using mutt with IMAP

As with fetchmail a sample .muttrc file can be found in the mutt documentation: /usr/doc/mutt-0.95.6/sample.muttrc. It should be copied to the user's home directory as .muttrc and given the same permissions used with .fetchmailrc. To point mutt at an IMAP server uncomment and edit the spoolfile line in .muttrc, and add the IMAP-specific lines:

```
set spoolfile="{roger}"
set imap_user="charles"
set imap_pass="bErNiCe"
set imap_checkinterval="300"
```

As with fetchmail, be aware of the presence of plain text passwords in these .rc files. In many situations it may be desirable to trade off the burden of having to enter them every time they are needed for the security of not having them lying around (even though they are on owner-only/read-write files).

There is an extensive mutt manual included with eServer. Again, like fetchmail, mutt is infinitely configurable; it's message threading (by Subject:) is easily the best in the business so for the power user who follows many email lists and swallows thousands of messages each week it is an excellent choice. Consider adding an editor that is more user-friendly than vi, such as jed, and spend some time tweaking the color settings in .muttrc.

Typically the first mutt configuration question that arises is "How do I set my From: header in mutt?" Add a line like this to .muttrc:

```
my_hdr From: mambo@b0z0s.com
```

4.3.5.3 Communicator and IMAP

Setting up Communicator to access an IMAP server is straightforward. The trick is to remember that Communicator will fill in most of the blanks for you! Once in the Mail Servers setup dialogue select the existing server labelled "pop" and rename it, for example, to "roger". Click on "Type" and select IMAP. Fill in the appropriate User Name, "mambo". At this point you can inspect the tabs labelled "IMAP" and "Advanced" and choose whatever features suit your fancy. There's no need to fill in any more blanks. Click "Ok" to apply your changes and mambo should be ready to read mail.

4.3.5.4 Turn off HTML email!

HTML formatted email is unacceptable in a well managed network. Turn it off, please. In Communicator's Preferences, under "Mail & Newsgroups," select "Formatting" and click on "Use the plain text editor". Click "Ok" to apply this change. Then you can begin an educational campaign to help your users understand the need for this policy. Stress security issues in this campaign. Scare them a little if you have to!

4.4 Security: Katie bar the door!

All eServer and eDesktop installations need to be tightened up. By default many network service ports are open and most of them can be closed, leaving only those needed by the users of a particular system. These measures ought to be taken on every host on your network.

What follows is not intended to be a complete security analysis, but only an indication of some beginning steps. ANY machine connected to the Internet is a potential launching platform for attacks on other systems, so even a small DNS/email server such as we have described in our example case could become implicated in highly destructive exploits. It is the responsibility of every system administrator to make all the hosts under his or her control as secure as possible.

4.4.1 nmap: Another category killer.

nmap is a "port scanner" that can yield invaluable information about the state of hosts on your network. You might as well get in the habit of scanning yourself since the blackhats will be doing it soon enough.

Here's a step-by-step:

- 1 Grab and install the latest nmap rpm from ftp.caldera.com or a mirror. You'll find it in `/pub/contrib/RPMS/libc6/`. Since a host cannot scan itself you'll need to install nmap on a machine other than the one you wish to scan. A safe bet is to install it on several hosts on your network.
- 2 By design nmap allows some of its functions to be invoked by normal users, and some only by root. Since some Internet users equate a port scan with an attack, you may wish to bar normal users of your network from invoking nmap:

```
# chmod 700 /usr/local/bin/nmap
```

A consequence of this step is that if you wish to use xnmmap, the GUI “frontend” to nmap, you will run into an X windows authorization issue, but as system administrator you can find workarounds for that wrinkle; on the whole restricting access to nmap is the best way to go.

3 RTFM: man nmap

Try out nmap with a simple ping scan. On gene you would run:

```
# nmap -ST roger
```

The output would look something like this:

```
Starting nmap V. 2.12 by Fyodor (fyodor@dhp.com,  
www.insecure.org/nmap/)
```

```
Interesting ports on roger.outersanctum.com  
(192.168.1.5):
```

Port	State	Protocol	Service
21	open	tcp	ftp
23	open	tcp	telnet
25	open	tcp	smtp
53	open	tcp	domain
79	open	tcp	finger
80	open	tcp	http
109	open	tcp	pop-2
110	open	tcp	pop-3
111	open	tcp	sunrpc
113	open	tcp	auth
143	open	tcp	imap2
389	open	tcp	ldap
622	open	tcp	unknown
901	open	tcp	unknown
1000	open	tcp	cadlock
6000	open	tcp	x11

```
Nmap run completed -- 1 IP address (1 host up) scanned  
in 0 seconds
```

That's too many wide open front doors. If we are to think of roger as only a DNS and email host, then port 80 can be closed by using COAS to remove it from the services started at boot. Similarly, remove ldap from that list. (You may find other services that can be removed if

you're not using them, such as the NFS server and the MySQL server.) Since we're using IMAP the pop ports can be closed in /etc/inetd.conf, as well as ftp, finger, swat and telnet. We're not using samba here so there's no need for swat. After making a copy of inetd.conf comment out the lines that begin with ftp, telnet, finger, pop3, pop2 and swat. Save the file, reboot roger and rerun the port scan.

Tip: After making those edits, take a look at the output of this command:

```
# grep -v '^#' /etc/inetd.conf
```

nmap's output should now look something like:

```
Starting nmap v. 2.12 by Fyodor (fyodor@dhp.com,  
www.insecure.org/nmap/) Interesting ports on  
roger.outersanctum.com (192.168.1.5):
```

Port	State	Protocol	Service
25	open	tcp	smtp
53	open	tcp	domain
111	open	tcp	sunrpc
113	open	tcp	auth
143	open	tcp	imap2
622	open	tcp	unknown
1000	open	tcp	cadlock
1024	open	tcp	unknown
6000	open	tcp	x11

```
Nmap run completed -- 1 IP address (1 host up) scanned  
in 0 seconds
```

That is a fair improvement. This list could be winnowed even further, but it's worth repeating that this Guide does not purport to be in any sense a complete or authoritative statement on network security. Since the changes noted above are so easy to implement there's no excuse for not making them. But the game's afoot and a conscientious sysadmin will find security matters occupying most of his or her time. The only lesson that has been demonstrated here is: don't run services your users do not need. (They will still be able to use ftp and telnet clients to access remote sites.)

Here are two recommended starting points for learning more about security:

`http://www.sans.org`, authoritative source of security information; a mandatory bookmark.

`http://www.snort.org`, has a thoughtful set of links to important security sites.

4.5 Appendix: Fixing the KDE Network Utilities

eServer's KDE desktop provides a set of network utilities with a graphical interface.

K -> Internet -> Network utilities

Ping and Finger should work "out of the box," but there may be difficulty with Traceroute and Host resolution, and mtr may not be there at all. It's simple to remedy these situations.

4.5.1 traceroute

Due to traceroute's location in the file structure it will be unavailable to normal users. (And no one is logging in as root anymore, right?) In the menubar click on Edit and then Preferences. Choose Traceroute and fill in the complete pathname to the command: `/usr/sbin/traceroute`. Click OK and test traceroute.

4.5.2 Host resolution

The tab labelled 'Host resolution' is a frontend for either of the commands `host` or `nslookup`. The default is `host`, and if you find this doesn't work properly you can change to `nslookup`. In the menubar click on Edit and then Preferences. Choose Host resolution, select the `nslookup` radio button, and fill in "nslookup" in the Pathname box. Click OK and test. `nslookup` is a powerful tool with many options that are not (easily) available apart from running `nslookup` on the command line. The man page for `nslookup` is the best place to start.

4.5.3 mtr

A combination of ping and traceroute, mtr can provide a useful view of the Internet “weather” prevailing on the path to a specified host. Like traceroute it will list each hop to the destination, but like ping it will return data on packets dropped for each hop. The source code for mtr can be downloaded from [ftp.bitwizard.nl](ftp://ftp.bitwizard.nl); get `mtr-0.42.tar.gz` or newer and place it in `/usr/local/src`. The following steps, executed as root, will install mtr:

```
# tar xzvf mtr-0.42.tar.gz
# cd mtr-0.42/
# ./configure --disable-gtktest
# make
# make install
# make clean
```

Now, in the Network utilities window, click on Edit, then Preferences and select mtr. In the Pathname box enter: `/usr/local/sbin/mtr` and click OK to finish. mtr should now be available.

5. Related Technology Issues

Some of the issues relating to DNS/e-mail include these:

- Security
- Authentication
- System Administration

Though not essential to the topic of DNS/e-mail, these topics will enrich your understanding of OpenLinux eServer and of Linux in general.

6. Definitions, Abbreviations, and Acronyms

This section includes an alphabetical listing of terms and their definitions, abbreviations, and acronyms that are used in this Solutions Guide.

For a general treatment of terms see "Fundamental Terminology for the Linux Professional," a White Paper by Dean R. Zimmerman. It is available online at this address:

<http://www.calderasystems.com/company/guides/>

NOTE: An on-line dictionary of many computer terms is available at:

<http://webopedia.internet.com/>

Alias An alias is an alternative name for a file or user.

BIND (Berkeley Internet Name Domain) is an implementation of the Domain Name System (DNS) protocols and provides an openly redistributable reference implementation of the major components of the Domain Name System, including:

- A Domain Name System server (named)
- A Domain Name System resolver library
- Tools for verifying the proper operation of the DNS server

The BIND DNS Server is used on the vast majority of name serving machines on the Internet, providing a robust and stable architecture on top of which an organization's naming architecture can be built. The resolver library included in the BIND distribution provides the standard APIs for translation between domain names and Internet addresses and is intended to be linked with applications requiring name service.

Command Line Interface The command line interface has been the common way for computer administrators and users to interact with computers -- at least since the advent of terminals. It provides more utility than the more "modern" WIMP interface of Windows, Icons, Mouse Clicks, and Pointing.

Daemon A background process in Linux (or UNIX). Pronounced demon or daymon.

DNS Abbreviation of Domain Name System (or Service), an Internet service that translates domain names into IP addresses. Because domain names are alphabetic, they're easier to remember. The Internet however, is really based on IP addresses. Every time you use a domain name, therefore, a DNS service must translate the name into the corresponding IP address. For example, the domain name www.example.com might translate to 198.105.232.4.

The DNS system is, in fact, its own network. If one DNS server doesn't know how to translate a particular domain name, it asks another one, and so on, until the correct IP address is returned.

eSP An e, for "electronic", solutions provider. These include value-added resellers, system integrators, distributors who specify technology, and corporate IT management, among others.

IP Internet Protocol. This protocol allows two hosts via TCP to exchange information, packets.

KDE K Desktop Environment. A Linux WIMP interface that also provides a wide range of utilities and games.

PERL An interpreted language (as opposed to compiled) that was designed by Larry Wall specifically for manipulating text. PERL is an acronym meaning Practical Extraction and Report Language. Because PERL is interpreted, programs written in PERL are called scripts.

TCP Transmission Control Protocol. TCP is the protocol that allows two hosts to communicate. See IP.

TCP/IP Transmission Control Protocol/Internet Protocol. A suite of protocols on which all Internet communication is based. See TCP and IP.

UTC Universal Coordinated Time. The new term for Greenwich Mean Time. Coordinated Universal Time is a time scale that couples Greenwich Mean Time, which is based solely on the Earth's inconsistent rotation rate, with highly accurate atomic time. When atomic time and Earth time approach a one second difference, a leap second is calculated into UTC.

WIMP Interface The system of graphical user interface consisting of Windows, Icons, Mouse Clicks, and Pointers. Commonly used in Microsoft products, it has the advantage of providing an easy, graphical front-end for users. At the same time, it inhibits system administration.

7. Evaluation Form

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Date of Publication: July 17, 2000

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8. About Caldera Systems

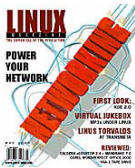
8.1. Company Profile

Caldera Systems Inc. is a "Linux for eBusiness" technology leader in developing and marketing successful Linux-based business solutions, including its award-winning OpenLinux, NetWare for Linux, Linux technical training, certification and support -- with free 30-day phone support and on-site consulting. Caldera OpenLearning Providers offer exceptional distribution-neutral Linux training and certification based on Linux Professional Institute (LPI(TM)) certification standards. Caldera Systems supports the open source community and is a leader in, and advocate of Linux Standard Base (LSB(TM)) and LPI(TM).

Caldera, Inc. was founded in 1994. Caldera Systems Inc. was created in 1998 to develop Linux-based business solutions. Based in Orem, UT, Caldera Systems has offices and 800+ resellers worldwide. For more information, see www.calderasystems.com or in the US call 888-GO-Linux (888-465-4689).

8.2. Awards

The best validation of a company's direction and achievement comes from its customers. Caldera Systems has won the admiration of its users and suppliers, as is evident from this list.



May, 2000. OpenLinux eDesktop 2.4 wins Linux Magazine's "Emperor Award"



April, 2000. OpenLinux 2.3 awarded "Editor's Recommendation" from PC ONLINE Testsieger



March, 2000. Upside Magazine ranked Caldera Systems as number 17 in the "Millennium 2000 eBusiness 150" award/listing



February, 2000. Andover.net Dave Central's "Best of Linux" Winner



February, 2000. OpenLinux 2.3 wins Linux Magazine's "Cool Product" Award
January, 2000



PC Direct (Ziff-Davis) "Best Buy 2000" award for OpenLinux 2.3



December, 1999. MikroPC (PC Magazine) chose OpenLinux 2.3 as "Product of the Year" in the operating system category



December, 1999. CEO Ransom Love listed as one of the "50 Linux People to Watch" by Linux Magazine



December, 1999. OpenLinux 2.3 is "The Linux Show's "Best Distribution of the Millennium" on their 1999 "Best of the Year" awards show



December, 1999. OpenLinux 2.3 is Internetweek's "Best of the Best" award for best software



November, 1999. OpenLinux 2.3/Lizard is Linux Journal's "Product of the Year".
Awarded at Comdex



October, 1999. Caldera Systems Listed in PC Magazine's "Top 100 Technology Companies that are Changing the World"



August, 1999. Linuxworld Editor's Choice Award: Best Client and Distribution, OpenLinux 2.2 Runner-up to "Product of the Year "



May, 1999. Network Computing's "Well-Connected Award" for Best Networked Operating System, OpenLinux 2.2



September, 1997. Caldera listed as one of Red Herring's Top 50 Privately Held Companies

8.3. Where to Find Caldera

Caldera OpenLinux products are available from a variety of sources around the world. Browse Caldera's OpenStore or choose the reseller most convenient for you. If you need assistance, please contact Caldera at 1-888-GO-LINUX (1-888-465-4689).

8.3.1 International Distributors

Argentina

InfoDax

Oswaldo Magnasco 771 (1706)
Haedo-Buenos Aires

Australia

A Better Computer Solution

500 City Road
South Melbourne, Victoria 3205

Australia

Phone: +61 3 9682 2577

Fax: +61 3 9682 2566

URL: www.abcs.com.au

E-mail: sales@abcs.com.au

G&V Advance Electronics

71 Drumalbyn Road
Bellevue Hill, 2023

Sydney, Australia

Phone: 61,2,9362,0043

Fax: 61,2,9362,3270

URL: www.gvae.com.au

E-mail: gandv@tmx.com.au

Belgium

MediaMix Benelux s.a./n.v.

Brusselsesteenweg 355

3090 Overijse

Belgium

Tel: 32 0 2 688 4022

Fax: 32 0 2 688 4024

E-mail: mediamix@skynet.be

Brazil

Skill Computer Services Ltda

Rua Porto Martins, 734

CEP-04575-140 Sao Paulo SP

Phone: +55-11-5505-0122

Fax: +55-11-5505-0457

Main URL: www.skill-computer.com.br

Linux Operations URL:
www.calderasystems.com.br

Support E-mail:
suporte@calderasystems.com.br

Sales E-mail: linux@skill-computer.com.br

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Merisel Canada Inc.

200 Ronson Drive

Etobicoke, Ontario

M9W 5Z9

Phone: 416-240-7012

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Brampton, Ontario L6T 4K4

Phone: 905-789-1234 main phone

Fax: 905-789-0695

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URL: www.pegasuswholesale.com

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Mississauga, Ontario L5T 2L3
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Fax: 905-795-3237

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ordenes@impsat.net.co
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www.linux-tiendavirtual.com
www.linux-compuclick.com

Croatia

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Strigina 4
10000 Zagreb
Croatia
URL: www.perpetuum.hr
Tel: 385 1 2305 789
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Phone: 358-9-612-1202
Fax: 358-9-612-1205
URL: [http:// www.dataclub.fi](http://www.dataclub.fi)
English URL:
<http://www.dataclub.fi/1inenglish.html>
E-mail: palvelu@dataclub.fi

France

Athena Global Services

Centre d'affaires Athena
20, allÈe Louis Calmanovic
F-93320 Les Pavillons sous Bois
Phone: +33(0)1 55 89 08 81
Fax: +33(0)1 55 89 08 89
URL: <http://www.athena-gs.com>

Germany

Beyond Distribution GmbH

Melchior-Huber-Str. 22
85652 Ottersberg
Phone: 49 8121 987-0
Fax: 49 8121 987-111
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81479 Munich
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Phone: 49 89 790 9790

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ITALY
Phone: +39 055 3226622
Fax: +39 055 3226444
URL: <http://www.brain.it>
E-mail: dealer@brain.it

CeloMax S.p.A.
Via Ramazzotti, 12
20020 Lainate (MI)
Italy
Phone: + 39 02 937641
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URL: www.celomax.com
E-mail: info@celomax.com

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Phone: +39 0744 432764
Fax: +39 0744 432748
URL: <http://www.wtrade.it>
E-mail: info@wtrade.it

Japan

Neonagy, Inc. (ne-onaji)
2-2-22 Kanda-tacho 2F,
Chiyoda-ku, Tokyo 101-0046, Japan
Phone: +81-3-3252-4300
Fax: +81-3-3252-4311
E-mail: info@neonagy.com
URL: www.neonagy.com

Mexico

MPS Mayorista, S.A. de C.V.

Xola 621 Col. Del Valle
México D.F.
Phone: (525)325-09-93
Fax: (525) 638-07-69
E-mail: mpsonline@mps.com.mx
URL: www.mps.com.mx

Sweden

Data Construction AB
Masholmstorget 3
Box 102
127 22 Skarholmen
SWEDEN
URL: <http://www.dataconstruction.se>
Tel: +46 8 680 70 00
Fax: +46 8 710 76 10

Taiwan

Shinewave International Inc.
4F, 126, Sec. 4, Nanking E. Rd.
Taipei, Taiwan, 105 R. O. C.
URL: <http://www.shinewave.com.tw>
Phone: (886-2) 2576-8388
Fax: (886-2) 2578-6808
E-mail: ahuang@shinewave.com.tw

United Kingdom

MediaGold International UK
Second Floor
151 Freston Road
London W10 6TH
Phone: 0207 221 4600
Fax: 0207 792 1611

United States

Frank Kasper & Associates, Inc
7351 Washington Ave.
Edina, MN 55439
Phone: 612,942,0566

Fax: 612,942,5039
E-mail: sales@kasper-cdrom.com
URL: www.kasper-cdrom.com

Note: International resellers should purchase through a local distributor, or if a local distributor is not available, through Frank Kasper.

Gates/Arrow

39 Pelham Ridge Drive
Greenville, SC 29615
Phone: 1-800-332-2222
URL: www.gatesarrow.com

Ingram Micro

PO Box 25189
Santa Ana, Calif. 92799-5189
Sales: 800-456-8000
Customer Service: 716-635-6446
New Accounts: 714-566-7705
URL: www.ingrammicro.com

Navarre

7400 49th Ave. North
New Hope, MN 55428
Phone : 800-728-4000 or 763-535-8333
Fax: 763-533-2156
URL: www.navarre.com

Savoir

254 E. Hacienda Ave.
Campbell, CA 95008

SupportNet

4400 West 96th Street
Indianapolis, IN 46268
Phone: 1-800-255-3390
URL: www.supnet.com

Tech Data

5350 Tech Data Drive
Clearwater, FL USA 33760

Phone: 1-800-237-8931
URL: www.techdata.com

Venezuela

Corvus Latinoamerica, C.A.
Av. La Colina, Qta. Corvus #97
Colina de Los Caobos
Caracas 1050 - Venezuela
Phone: +58.2.7828013
Fax: +58.2.7930609
E-mail: info@corvusnet.com
URL: www.corvusnet.com

8.3.2 Retailers

Retail Stores

Babbages
Barnes & Noble
Best Buy
BJ's Wholesale Club
Borders
Chapters
Circuit City
CompUSA
Compucenter (Canada)
Compusmart (Canada)
Electronics Boutique
Fry's
Furniture Mart
Future Shop (Canada)
Hastings
J&R Music World
Micro Center
Multimedia Technologies (Canada)
Musicland
Nationwide Computers & Electronics
On Que
Radio Shack (Canada)

Walden Books

Mail Order

Chumbo.com

CheapBytes

eLinux.com

Indelible Blue

Linux Central

Linux Mall

Linux Systems Labs

MicroWarehouse

TheLinuxStore.com

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