

## Integrating Windows and Linux

Many organizations would like to start integrating Linux into their organizations but do not know how to begin. For the most part, the users are quite happy with the tools they have with Microsoft. The organization doesn't want to rock the boat but they would like to find ways to reduce their overall computing costs.

Few organizations ever do a "total cost of ownership" analysis prior to setting up their office computers. Most organizations simply take the "path of least resistance". If the solution works and the organization is satisfied with the cost performance they are getting from their licensed software, there is absolutely no reason to change. Many organizations are quite happy with things the way they are.

This article is designed for organizations looking to reduce their license costs or organizations that simply want to explore other options so that they have more leverage in selecting solutions for their organization. Even the most Microsoft centric organization owes it to themselves to experiment with alternatives. It might always help during negotiations with Microsoft that your organization is at least experimenting with alternatives.

The best way for an organization to start integrating Microsoft Windows and Linux solutions is to start with the servers. Many server functions can be replaced without disruption to the enterprise. It is possible to configure Linux Servers so that they appear to the network and PC Users like a Windows based server.

### Samba

The Server Message Block (SMB) is the most common file sharing protocol as it ships with every single copy of Microsoft Windows. SMB is also found in PDAs running Windows CE. SMB can be traced back to the old days of DOS. IBM used SMB to communicate with the original network cards. IBM moved SMB to token ring and then to Ethernet.

SMB was adopted by several vendors and moved on to other protocols. Up until Windows 2000, SMB was tied to NetBIOS. Win2000 introduced SMB packet transport over TCP/IP. SMB was encompassed into Common Internet File System (CIFS).

The underpinnings of CIFS is a hodge podge of documented and undocumented protocols. While the underlying protocols are ugly, what is presented to the users is a slick interface known as Network Neighborhood.

The upgraded version of SMB that now runs on top of TCP/IP gets rid of legacy name resolutions known as WINS. Instead, CIFS now uses the open Dynamic DNS and Kerberos for authenticating. Microsoft now uses Active Directory which is similar but different than LDAP.

The native files sharing used in the Unix world is NFS. NFS was developed by Sun Microsystems. Sun had made NFS available for Microsoft systems for years, but it has always been a commercial product. The most popular way to allow Unix and GNU/Linux systems to interoperate is to use Samba. Samba is derived from the letters SMB and its an open source implementation of CIFS.

Chances are that Samba is already installed on your machine along with your GNU/Linux distribution. You can check to see if it is installed by issuing the following *rpm* commands.

```
$ rpm -q samba
```

```
$ rpm -q samba-client
```

```
$rpm -q samba-common
```

If Samba is not installed, it can generally be installed with the `rpm -i` command on the Linux distribution disk. Samba can be downloaded from the web by going to <http://www.samba.org>. You will need to read the instructions included with the archived files.

An article in ITWeek <http://www.itweek.co.uk/News/1131114> demonstrated that organizations can expect a boost in performance and cost savings by implementing Samba:

*"Results published this week in IT Week's sister publication PC Magazine show that the latest Samba software now surpasses the performance of Windows 2000 by about 100 percent under benchmark tests.*

*In terms of scalability, the results show that Linux and Samba can handle four times as many client systems as Windows 2000 before performance begins to drop off. Consequently firms can save money on hardware and software upgrades, and can avoid the administrative and financial costs of licensing Windows file servers, by using the Samba alternative."*

A self-paced tutorial on how to set up Samba is available from IBM on the following: website <http://www-1.ibm.com/servers/esdd/tutorials/samba.html?t=gr.psl=SambaTutorialOverview>.

One of the things I do not want to do is to trivialize migrating to Samba. It is important to keep the goals in mind.

A very good success story can be found on:  
[http://www.insiderreports.com/storypage.asp\\_Q\\_ChanID\\_E\\_SO\\_A\\_StoryID\\_E\\_20001707](http://www.insiderreports.com/storypage.asp_Q_ChanID_E_SO_A_StoryID_E_20001707).

*"The software offers cost savings not only because customers don't have to pay for the server operating system, but also because they don't have to pay "client" license fees for all the computers that use the server. And Microsoft appears to be feeling the pressure. The company has been aggressively pushing a version of Windows 2000 that computer makers may customize for jobs such as file and print servers, luring big names such as Dell Computer, Compaq Computer and Maxtor to ship these "Windows-powered" products.*

*With the Linux/Samba combination I get all the network configuration options that I need in a faster-running, less processor-intensive package. And I don't have any client access fees. No matter how many users we add to our network, access to the file and print servers remains free."*

Make sure to install an application called Samba Web Administration Tool (SWAT).

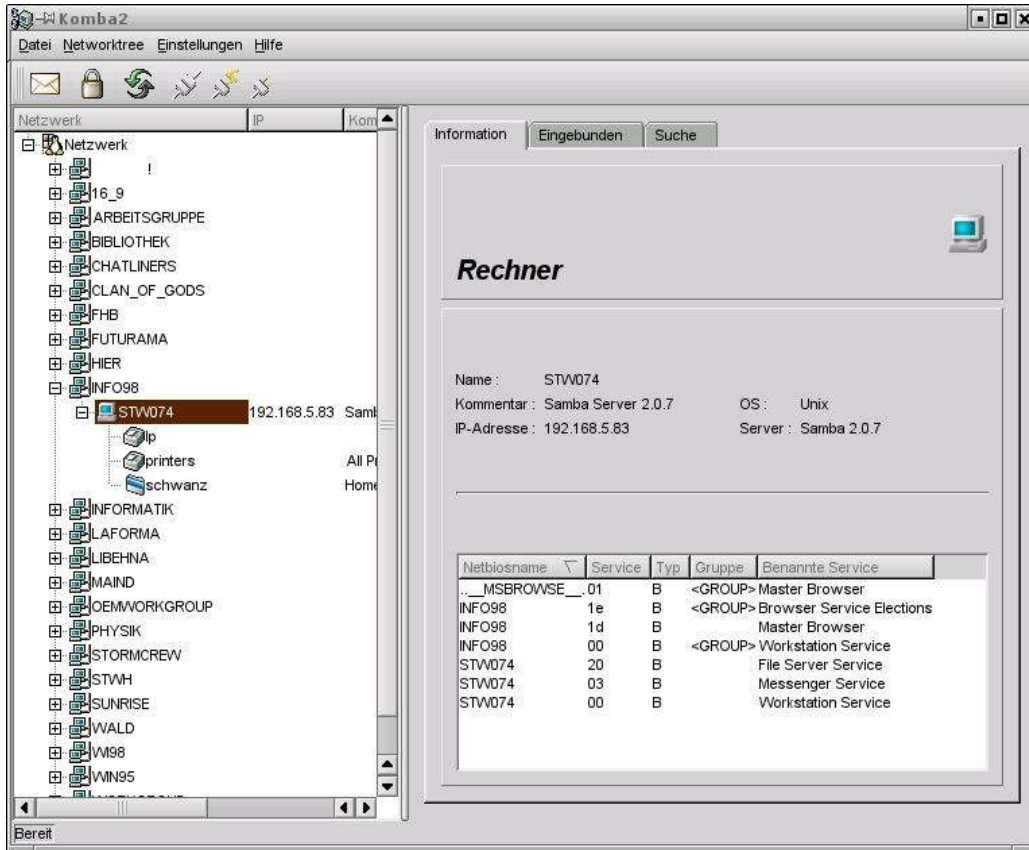
SWAT is a web based tool that will allow you to configure SWAT from any browser. To administer, simply point your browser to the local host at port 901 as <http://localhost:901>.

A login window will appear that requires you to enter a User ID and Password. Enter the User ID root and the respective password for root on your Linux server.

After entering the correct user name and password you will be taken to the SWAT homepage. The homepage includes a centrally located area of detailed documentation on how to use each feature of Samba.

There are many ways to implement a Samba server in an organization. You can buy a server preconfigured from a variety of companies. You can also purchase a Server Appliance. The best known example of this is the Sun Cobalt appliance server. The Appliance server is basically a stripped down PC that runs several open source services such as mail, firewall, remote administration, Samba, database and proxy server. Generally speaking, these work by the administrator filling out some forms and then just letting the machine run. There are front-end configuration tools for Samba included with both KDE and Gnome.

Once you have your Samba server set up and configured, the existing Windows clients will see the server on Network Neighborhood. Samba servers can be set up to control printers on the network as well. There are at least three applications that mimic Network Neighborhood on Linux desktops. These include XMS Browser which is available at <http://www.public.iastate.edu/~chadspen/xsmbrowser.html>, Komba, <http://zeus.fh-brandenburg.de/~schwanz/php/komba.php3> and Linneighborhood, [http://freshmeat.net/projects/linneighborhood/?topic\\_id=150](http://freshmeat.net/projects/linneighborhood/?topic_id=150).



*Komba, a Network Neighborhood like program for Unix/Linux desktops.*

There are several software platforms that can convert any x386 based platform into a server appliance. Best known of these is e-Smith which is now known as SME ([www.e-smith.org](http://www.e-smith.org)). A free version is available for download. SME is marketed by Mitel Networks. Mitel has a variety of additional services that they sell on a subscription basis.

I have tested many server appliance solutions to include, Clark Connect, e-Smith (now SME), and NetMax. In Thailand, there is a very good free server tool called SIS (<http://www.nectec.or.th/linux-sis/>). Each of these distributions provide the same power as dedicated server appliances, but for much less money. A PC running eSmith has essentially the same power as a much more expensive Sun Cobalt server appliance.

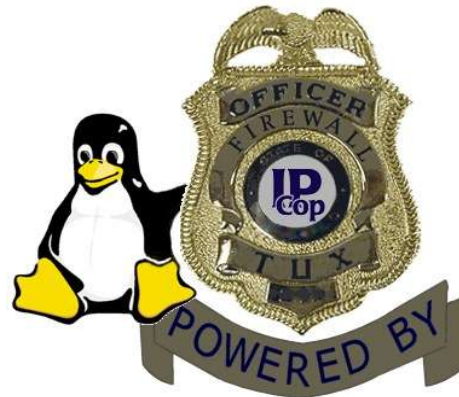


Ultimately, the organization will have more flexibility if they create solutions from a standard Linux distribution and add features as required. Red Hat, Mandrake and most other distributions allow you to install a server configuration. There are tools such as Webmin (<http://www.webmin.com/intro.html>), that will allow you to manage your server remotely. It is an easy matter to install Webmin on every GNU/Linux desktop and server. This will allow the system administrator to remotely access every system simply by accessing a web browser. If the organization installs a VPN, then the administrator can administer each system from anywhere.

Smoothwall ([www.smoothwall.org](http://www.smoothwall.org)) is a commercial company that offers a freely downloaded version of their package but also sells commercial versions. Smoothwall is very easy to install, setup and manage

the firewall, server, router, virtual private network and web server. Smoothwall can be administered using a web browser.

IPCOP ([www.ipcop.org](http://www.ipcop.org)) started by building on the GPL version of Smoothwall. The newer versions of IPCOP have branched from the Smoothwall code. IPCOP is available for free. Both Smoothwall and IPCOP work very well. Smoothwall has a commercial version that features advanced Virtual Private Networks (VPN). IPCOP can set up VPNs but the keys must be changed manually which is not appropriate for an organization with lots of locations. My company uses IPCOP to connect to our dialup and ADSL network. We have set up an invisible proxy server. IPCOP allows you to block specific websites. All administration can be done using only a web browser.



All Linux distributions are relatively inexpensive. Most of them are available in some form as a free download. My advice to any organization is to acquire and download as many different distributions as possible. Get to know each distribution's strengths and weaknesses.

Some Linux distributions will support hardware that another distribution will not support. Having different distributions will provide the most flexibility. I would certainly advise that organizations also investigate the various BSD offerings. Once servers are set up and operational, they can generally be administered very easily.

Virtually every GNU/Linux distribution provides Apache. Apache is the most commonly used web server on the Internet. Apache is more widely used than any other web solution. Apache is free to use and is very well documented.

Combining Apache with PHP and a free SQL database such as MySQL or PostgreSQL allows web users to build very powerful web based applications. My company runs its accounting system using a custom web based system that is written around PHP and MySQL. Sales are recorded using only a browser.

It is best to approach Apache, PHP and MySQL as a single solution. Combining these three free resources with Samba can displace the need for Microsoft 2000 Advance Server (\$3,995 which includes 25 client licenses with additional licenses costing \$67 each), Web Server (bundled with NT and 2000 server), Microsoft SQL Server (\$4,999 per server).

There are a number of tools that convert existing SQL and Access databases to MySQL. A list of converters can be found on MySQL's website. Most of these are commercial products but given the potential savings, these packages are well worth their price.

One product that gets consistently good reviews is MydbPAL at <http://www.it-map.com/>.

It is possible to use OpenOffice as a frontend to MySQL in the same way that Access is used to frontend Microsoft SQL server. A very good document that describes how to achieve this can be found at: <http://www.unixodbc.org/doc/OOoMySQL.pdf>

#### **E-mail**

Using Microsoft Exchange Server can be quite expensive. The cost for Microsoft Exchange Server is \$1,299 which includes five client licenses. This charge is for each exchange and not just the server that connects to the Internet. After the first five clients, there is a \$67 per client charge.

If it is just a matter of sending and receiving e-mail, it is quite easy to replace Exchange. Virtually every GNU/Linux distribution and BSD include several options for e-mail. The issue is that Exchange

integrates a calendaring program as part of their e-mail system.

Organizations should conduct a survey and see just how many people on the staff are actually using the calendaring features of Exchange. Outlook is installed on all computers running Microsoft Windows. It can be used in two ways.

With Outlook **without** Exchange, the users have access to

- personal calendar
- e-mail clients
- address book

**With** Outlook and Exchange, the user also has:

- Shared Calendar
- Meeting Management
- Public Folder
- Global Address Book
- Free/Busy Time

Ximian ([www.ximian.com](http://www.ximian.com)) has released a free Outlook clone named Evolution that is available on many Linux distributions. I personally believe this is an excellent e-mail client. I have never exchanged calendars with anyone, but I do keep a calendar. I keep it on my Palm Pilot. Evolution will sync its internal calendar with the Palm. Ximian sells a product they call Connector that will allow Evolution users to plug directly into Exchange servers. The cost is about the same per client charge as Exchange Server so there isn't much savings from using Microsoft Exchange. Evolution does provide users a familiar and powerful environment for e-mail as well as personal calendaring.

A company named Steltor has an Exchange replacement. This company has been acquired by Oracle. Oracle's acquisition of Steltor provides a very strong competitor to Microsoft Exchange Server. Information on Oracle's alternatives to Microsoft Exchange can be found on [http://www.oracle.com/features/ocs/tlcs\\_email.html](http://www.oracle.com/features/ocs/tlcs_email.html).

Some studies show the number of Lotus Notes users equal to or slightly more than Microsoft Exchange. Lotus Notes is owned by IBM and there are versions of it that will run on most popular Unix and GNU/Linux boxes.

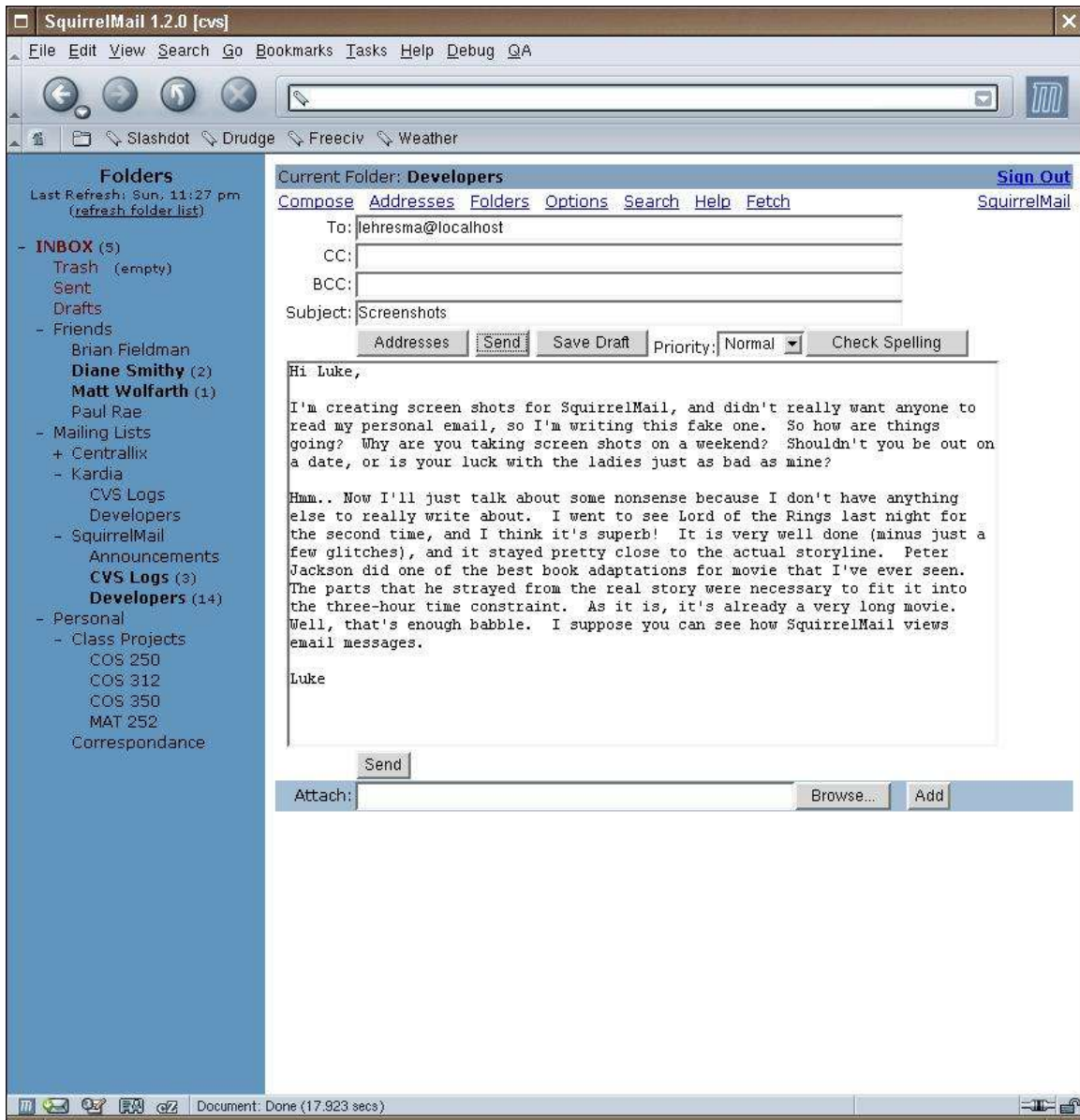
Bynrari ([www.bynari.net](http://www.bynari.net)) offers a lower price alternative to Exchange Server. The average cost per user is around \$20 instead of \$67 per user. Bynrari is reputed to scale better and perform better than Exchange Server.

If calendaring is not required, then Sendmail can be used. Sendmail is very popular, comes with almost all GNU/Linux distributions, is free and scales very well. You can get plenty of information about Sendmail at <http://www.sendmail.org/>. Another very popular package is Qmail. Qmail is easier to configure and is considered to be more secure than sendmail. Qmail's website is <http://www.qmail.org/top.html>. Another very popular e-mail package is Postfix (<http://www.postfix.org>).

A free program from the Groovy Organization(<http://the.groovy.org/blackhole.shtml>) called Blackhole can check viruses and SPAM.

If your organization would like to allow members from the organization to access e-mail over the web, such as you can do with Hotmail, there are several solutions. IMP is perhaps the most popular. IMP requires a browser that supports JavaScript, tables and cookies. IMP is available from ([www.horde.org](http://www.horde.org)). An easy way to set up e-mail is to use e-Smith, now called SME, which can be downloaded from [www.e-smith.org](http://www.e-smith.org). As mentioned earlier, installing e-Smith on a standard PC gives you a complete easy to administer server.

Squirrel E-mail (<http://www.squirrelmail.org/>) is another web-based e-mail package. It is included with SoL 15.00. SoL <http://www.sol-linux.com/> is a very complete server package available for free download.



*Screenshot of Squirrel Mail Compose screen accessed from a browser.*

There are some very interesting plug-ins for Squirrel E-mail. One of them is a shared calendar program. Because the calendar is web based, it can be accessible from anywhere in the world. It is a simple matter to set up a virtual private network using SoL, e-Smith, Smoothwall, or IPCOP and then allowing people in the organization to securely read their e-mail or check calendars using any web browser.

SuSE produces a complete e-mail server that supports web based mail and supports the Outlook FreeBusy function. The complete e-mail server is \$995 and does not require any client side licenses. The url is [http://www.suse.com/us/business/products/suse\\_business/email\\_server/index.html](http://www.suse.com/us/business/products/suse_business/email_server/index.html). The SuSE e-mail package includes one year of support.

### Summary of Replacing Exchange Servers

Microsoft is where they are because they not only make very good software, but they also offer powerful solutions that are inexpensive in historical terms. All anyone has to do is see what it would have cost to offer messaging twenty years ago on a mainframe to see just how economical it has become.

Even so, every organization should do an analysis and justify their decisions based on the technical

merits and total cost of ownership. When total cost of ownership is considered, it is impossible not to look at GNU/Linux or BSD solutions. It also becomes worthwhile to look at commercial Unix solutions, particularly for mission critical applications.

Each organization needs to know what the organization's real requirements are. If the requirements are simply e-mail and not collaborative calendaring, then less expensive solutions can be proposed without impacting the organization.

Each organization needs to know to what extent they are in violation with software licensing requirements; and they need to take steps to correct the problem. The organization needs to implement a policy that warns its staff against using unlicensed software.

When the organization decides they will have to make changes, they need to consider the impact this will have on technology, services, people and the organization. They need to sell the benefits of these changes and they need to implement them in such a way as to not create organizational chaos.

Using GNU/Linux to replace file and print servers is easy to do and should be invisible to the users. The savings for moving file and print services to a Samba based server can be substantial. Moving applications to an Open Source database software such as MySQL or PostgreSQL can also result in substantial savings and is moderately easy to implement. There are tools that will convert databases from one format to another and there is a free tool (asp2php) that will convert asp based web pages to PHP.

Replacing Exchange Server can be easy or difficult. That depends mostly on to what degree your organization has become dependent on the calendaring functions built into Exchange. If the organization only uses Exchange Server for e-mail, then the organization needs to determine what e-mail protocols suits the organization best. The three most important e-mail protocols are SMTP, POP3 and IMAP4.

There are many Open Source solutions for e-mail, the most widely used are sendmail, qmail and postfix. E-mail can be enhanced with web based front-ends that even add calendaring. One of the easiest ways to bring up an e-mail system is to use a distribution that creates a Server Appliance. SME (e-smith) is one the best known.

If collaborative calendaring is a hard requirement, each organization should consider alternatives and make comparisons. IBM, Oracle and Bynrari have solutions that they each claim is less expensive than Microsoft's.

While alternate solutions can be less expensive, there is also the benefit that it opens up new hardware possibilities. Many organizations suffer from server bloat. They exceed the capacity of a single server so they keep adding more and more servers. In the long run, it might be less expensive to use a more powerful dedicated Unix server than to have a lot of small computers. Armed with the facts, it will be easy to do your own comparisons.