Linux vs. Windows
The Bottom Line

An examination of the purchase and licence cost
differences between Linux & Open Source platforms
and the Microsoft platforms

DRAFT

If you notice any inaccuracies in this document, please bring them to our attention
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Executive Summary

There has been much discussion in recent years within the Information Technology industry worldwide about the relative merits of Microsoft's operating systems and applications on one hand, and the Linux & Open Source operating systems and platforms on the other. While it is very difficult to qualitatively analyse the technical, reliability, security and total–cost–of ownership differences between these two competing platforms, it is a (reasonably) straightforward matter to determine their purchase price and licencing costs. This is exactly what this document undertakes to do.

Linux saved Intel 200 million dollars[1]
– Doug Busch, Intel IT Vice President

To produce some meaningful numbers, we considered three seperate and hopefully realistic models for organisations which use compter servers and workstations. These models outline fairly standard organisations which employ 50, 100 and 250 staff who use computers. The numbers and categories of workstation and server usage are covered within this document. The methodology of how we researched and arrived at the pricing information are also shown within the document. While we don't claim to be experts on licencing and cost–optimisation for the products discussed within this document, we believe that through collating this information and making it available in this format, we will encourage discussion and perhaps elucidate from readers an ever-more accurate licencing picture. We would be pleased to produce ongoing updates to this document as new licence pricing information is made available to us. Now, for the summarised pricing differences, as shown in the table below. *One quick note: all pricing is in US$, which should make conversion to your national currency easier.*

	Microsoft Solution	Linux/Open Source Solution	Savings Achieved by Using Linux
Company A with 50 Users	$69,987	$80	**$69, 907**
Company B with 100 Users	$136,734	$80	**$136,654**
Company C with 250 Users	$282,974	$80	$282,894

1. http://www.zdnet.com/zdnn/stories/news/0,4586,5098955,00.html

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Windows Platform Solution

For our Windows platform solution, we have selected the following operating systems, back–office technologies and office productivity tools.

Microsoft Internet Information Server 5	Free	Microsoft	Bundled with Microsoft NT and 2000 server for free. However is not open and only runs on Microsoft platforms.
Microsoft Windows 2000 Advanced Server	$3,999.00	Microsoft	Comes with 25 Client Access Licenses (CALs). AdditionalCALs are $67 each.
Microsoft Commerce Server	$12,999.00	Microsoft	This is a per processor license. Product indludes SQL Server.
Microsoft ISA Standard Server 2000	$1,499.00	Microsoft	This is a per processor license. Product includes firewall and proxy server software.
Microsoft SQL Server	$4,999.00	Microsoft	This is a per processor license.
Microsoft Exchange Server 2000	$1,299.00	Microsoft	Comes with 5 Client Access Licenses (CALs). AdditionalCALs are $67 each.
Windows XP Professional Full version	$299 (per user)	Microsoft	
Microsoft Visual Studio 6.0	$1,079.00	Microsoft	
Microsoft Office Standard	$479 (per user)	Microsoft	
Adobe Photoshop 6.0	$609.00	Adobe	

Linux Platform Solution

For our Linux platform solution, we have selected the following open source back–office technologies and office productivity tools.

	Price	Comments
Red Hat 7.2 or Mandrake 8.1 or SuSE 7.3 Official Boxed Sets	$59.95 $55.00 $79.95	Linux Distributions, suitable for workstations or servers.
Apache (Web server)	Included with Linux distributions or free download.	An efficient and extensible web server, used on 59% of web servers on the Internet.
Squid (Proxy server)	Included with Linux distributions or free download.	A high–performance web–cache proxy server.
mySQL (Database)	Included with Linux distributions or free download.	A fast, free and flexible SQL server.
Iptables (Firewall)	Included with Linux distributions or free download.	A powerful Linux packet filter control utility (firewall).
Sendmail (Mail server)	Included with Linux distributions or free download.	A powerful and flexible Mail Transport Agent.
KDevelop (IDE)	Included with Linux distributions or free download.	A feature rich Integrated Development Environment that supports C and C++.
GIMP (Graphics)	Included with Linux distributions or free download.	The GNU Image Manipulation Program, for photo retouching
StarOffice (Productivity Suite)	Included with Linux distributions or free download.	A full–featured, Microsoft Office–compatible productivity suite that runs on Linux, Solaris and Windows.
AllCommerce (e–Commerce System)	Available for free download from http://allcommerce.sourceforge.net/	A full featured open source e–Commrce system

NB: As Linux is generally taken to be immune from viruses in general, and from all Windows vireses specifically, we have not added any virus–scanning software to this list.

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Case Study: 50 User Site

Case Study one, is of a network with 50 users, all requiring standard office productivity solutions, email, intranet and internet services & SQL data access.A small number of specialist technical/developer workstations are also required. Their network includes:

– 45 x Standard Workstations
– 3 x Developer Workstations
– 2 x Graphics/Design Workstations
– 1 x Mail Server
– 1 x File/Print Server

– 1 x Proxy/Firewall Server
– 1 x Intranet & SQL Server
– 1 x E–Business Server
 (incl. SQL & Webserver)

Microsoft Solution Licence Cost

Norton Antivirus 2002	50 copies	**$2,497.50**
MS Internet Information Server	2 copies	**$0.00**
MS Windows 2000 Advanced Server	5 copies	**$19,995.00**
MS Commerce Server	1 copy	**$12,333.00**
MS ISA Standard Server 2000	1 copy	**$1,499.00**
MS SQL Server 2000	1 copy	**$4,999.00**
MS Exchange Standard Server 2000	1 copy	**$1,299.00**
Windows XP Professional	50 copies	**$14,950.00**
MS Visual Studio 6.0	3 copies	**$3,237.00**
MiS Office Standard	50 copies	**$23,950.00**
Adobe Photoshop 6	2 copies	**$1218.00**
Additional Client Access Licences	30 licenses	**$2,010.00**
Total		**$69,987.00**

Linux Solution Licence Cost

LInux Distrobution (eg Suse 7.3)	only 1 copy necessary	**$79.95**
Apache (Web server)	provided with distribution	**$0.00**
Squid (Proxy server)	provided with distribution	**$0.00**
mySQL (Database)	provided with distribution	**$0.00**
iptables (Firewall)	provided with distribution	**$0.00**
Sendmail (Mail server)	provided with distribution	**$0.00**
KDevelop (IDE)	provided with distribution	**$0.00**
GIMP (Graphics)	provided with distribution	**$0.00**
StarOffice (Productivity suite)	provided with distribution	**$0.00**
AllCommerce (e–Commerce system)	only 1 copy necessary (free download)	**$0.00**
Total		**$79.95**

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Case Study: 100 User Site

Case Study two, is of a network with 100 users, all requiring standard office productivity solutions, email, intranet and internet services & SQL data access.A small number of specialist technical/developer workstations are also required. Their network includes:

– 95 x Standard Workstations
– 3 x Developer Workstations
– 2 x Graphics/Design Workstations
– 1 x Mail Server
– 2 x File/Print Server

– 1 x Proxy/Firewall Server
– 1 x Intranet & SQL Server
– 1 x E–Business Server
  (incl. SQL & Webserver)

Microsoft Solution Licence Cost

Norton Antivirus 2002	100 copies	**$4,995.00**
MS Internet Information Server	2 copies	**$0.00**
MS Windows 2000 Advanced Server	6 copies	**$23,994.00**
MS Commerce Server	1 copy	**$12,333.00**
MS ISA Standard Server 2000	1 copy	**$1,499.00**
MS SQL Server 2000	1 copy	**$4,999.00**
MS Exchange Standard Server 2000	1 copy	**$1,299.00**
Windows XP Professional	100 copies	**$29,900.00**
MS Visual Studio 6.0	3 copies	**$3,237.00**
MiS Office Standard	100 copies	**$47,900.00**
Adobe Photoshop 6	2 copies	**$1,218.00**
Additional Client Access Licences	80 licenses	**$5,360.00**

Total   **$136,734.00**

Linux Solution Licence Cost

LInux Distrobution (eg SuSE 7.3)	only 1 copy necessary	**$79.95**
Apache (Web server)	provided with distribution	**$0.00**
Squid (Proxy server)	provided with distribution	**$0.00**
mySQL (Database)	provided with distribution	**$0.00**
iptables (Firewall)	provided with distribution	**$0.00**
Sendmail (Mail server)	provided with distribution	**$0.00**
KDevelop (IDE)	provided with distribution	**$0.00**
GIMP (Graphics)	provided with distribution	**$0.00**
StarOffice (Productivity suite)	provided with distribution	**$0.00**
AllCommerce (e–Commerce system)	only 1 copy necessary (free download)	**$0.00**

Total   **$79.95**

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Case Study: 250 User Site

Case Study three, is of a network with 250 users, all requiring standard office productivity solutions, email, intranet and internet services & SQL data access.A small number of specialist technical/developer workstations are also required. Their network includes:

- 245 x Standard Workstations
- 3 x Developer Workstations
- 2 x Graphics/Design Workstations
- 1 x Mail Server
- 5 x File/Print Server
- 1 x Proxy/Firewall Server
- 1 x Intranet & SQL Server
- 1 x E–Business Server
  (incl. SQL & Webserver)

Microsoft Solution Licence Cost

Norton Antivirus 2002	250 copies	**$12,487.50**
MS Internet Information Server	2 copies	**$0.00**
MS Windows 2000 Advanced Server	9 copies	**$35,991.00**
MS Commerce Server	1 copy	**$12,333.00**
MS ISA Standard Server 2000	1 copy	**$1,499.00**
MS SQL Server 2000	1 copy	**$4,999.00**
MS Exchange Standard Server 2000	1 copy	**$1,299.00**
Windows XP Professional	250 copies	**$74,750.00**
MS Visual Studio 6.0	3 copies	**$3,237.00**
MiS Office Standard	250 copies	**$119,750.00**
Adobe Photoshop 6	2 copies	**$1218.00**
Additional Client Access Licences	230 licenses	**$15,410.00**

Total   **$282,973.50**

Linux Solution Licence Cost

LInux Distrobution (eg Suse 7.3)	only 1 copy necessary	**$79.95**
Apache (Web server)	provided with distribution	**$0.00**
Squid (Proxy server)	provided with distribution	**$0.00**
mySQL (Database)	provided with distribution	**$0.00**
iptables (Firewall)	provided with distribution	**$0.00**
Sendmail (Mail server)	provided with distribution	**$0.00**
KDevelop (IDE)	provided with distribution	**$0.00**
GIMP (Graphics)	provided with distribution	**$0.00**
StarOffice (Productivity suite)	provided with distribution	**$0.00**
AllCommerce (e–Commerce system)	only 1 copy necessary (free download)	**$0.00**

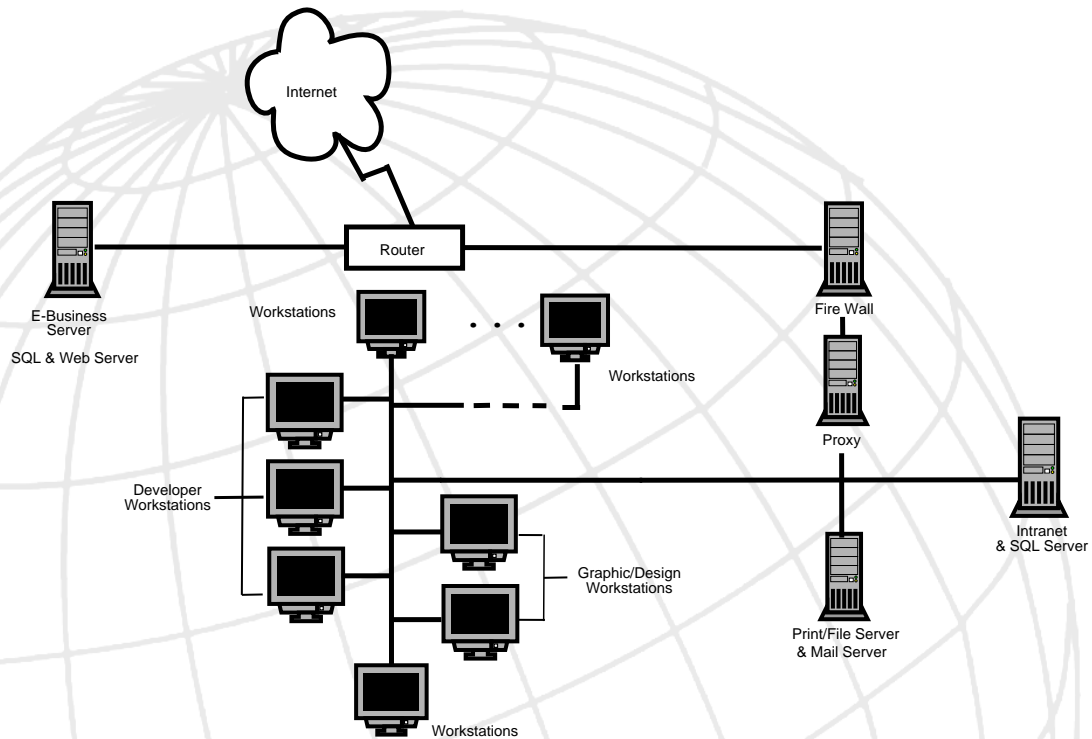Total   **$79.95**

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Appendix 1

Basic Network Diagram

Please note that the diagram above is only a basic schematic and only accurately reflects the network for the Case Study One with 50 workstation users. Case Study Two has twice as many File & Print servers, and Case Study Three has five times as many File & Print servers.

Further, it is assumed that both the Windows and Linux platform solutions will use exactly the same hardware and the same networking equipment and cabling. Thus, this cost is equal from both solutions, and can be ignored in our case study. It is also assumed that IT professionals will be hired to install and configure all systems, servers, and workstations, so this cost too will be approximately the same between both platform solutions, and can also be ignored.

By way of explanation of the purpose of the servers, the file and print servers are included to provide corporate of file–sharing facilities. The file–server also doubles–up as the mail server, which is used by all users to send and receive internet–standard e–mail. The Intranet server is used to provide the organisation's knowledge repository, portal and groupware requirements, all back–ended by an SQL database. The firewall provides advanced perimeter defence against Internet crackers. The proxy–server is used to provide web–cache and download acceleration functionality. The Internet–visible e–business/e–commerce server provides the client–required communication facilities and web–publishing this organisation needs, also back–ended by a production SQL server.

Appendix 2

Pricing Research Method

To retrieve software prices, we visited the official sites for the official software vendor. We then navigated the site until a price was found for the product. Although this may have not been the cheapest price, we consider that the price on the official site would be the most authoritative price, and would be truly indicative. We have provided all web addresses to these pricing web pages within this document for your reference.

When it came to Microsoft licensing agreements, the price of the software was taken from the vendor's site, and if additional user licenses were needed, their price (once again taken from the Microsoft website) was added onto the cost of the product.

Where possible, we have also tried to research volume licensing and other such licensing agreements. If there was little clear information and pricing detail on vendor's web–sites, we did not include that information in our calculations.

Pre–installed Operating Systems

Many organisations purchase workstations with software such as Windows XP or 2000 Professional or pre–installed. As the purchase price of the operating system (Windows XP, 2000) is included in the purchase price of the workstation and as this pricing information is generally not made publicly available, we have had to avoid this style of costing. As such, it is assumed that all server and workstation hardware is purchased with *no* operating system licence whatsoever, and that this operating system licence cost is now to be included in our calculations for the various models (50, 100, 250 user) of organisation we are studying.

A note on upgrading older Windows Operating Systems

As you by now would have realised, this study makes the assumption that the model organisations in question, are building up a whole IT infrastructure from scratch. Many people will likely ask if this is a realistic model for making price comparisons, as many organisations in the real–world would likely already have many older versions of Windows (95, 98) operating systems and Microsoft productivity software (Office 95, 97) on–hand, with which to procure upgrades with. This may be true, but our mission is to present a 'greenfields' company licencing costing, where these pre–existing systems aren't available, in order to accentuate the licencing differences and thus make them amenable to study and discuss. Further, information at hand indicates that Microsoft is abandoning upgrades to current generation technologies from versions more than one iteration old, so the minimise–cost–through–upgrade approach will cease to exist for many organisations interested in current generation software technology from Microsoft.

Finally, it is also worth mentioning that Microsoft's various licensing agreements are currently being modified and replaced, so the long term validity of a licensing scheme such as volume licensing is unknown.

Appendix 3

Pricing Resources

Norton Antivirus 2002
http://www.symantecstore.com/dr/v2/

MS Windows 2000 Advanced Server
http://www.microsoft.com/windows2000/advancedserver/howtobuy/pricing/default.asp

MS Commerce Server
http://www.microsoft.com/commerceserver/howtobuy/pricing/default.asp

MS ISA Standard Server 2000
http://www.microsoft.com/isaserver/howtobuy/pricing/default.asp

MS SQL Server 2000
http://www.microsoft.com/sql/howtobuy/pricing/default.asp

MS Exchange Standard Server 2000
http://www.microsoft.com/exchange/howtobuy/pricing/default.asp

Windows XP Professional
http://www.microsoft.com/windowsxp/pro/howtobuy/pricingretail.asp

MS Visual Studio 6.0
http://msdn.microsoft.com/vstudio/prodinfo/purchase/pricing.asp

MiS Office Standard
http://www.microsoft.com/office/howtobuy/pricing.htm

Adobe Photoshop 6
http://www.adobe.com/store/products/photoshop.html

Mandrake 8.1
http://www.mandrakestore.com/en/storemdkinc−8.1.php

Red Hat 7.2
http://www.redhat.com/software/linux/7−2_standard.html

SuSE 7.3
http://shop.suse.com

NB: All links were working and correct as of 2001−11−19

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Appendix 4

Information and References for Linux

Red Hat Linux   http://www.redhat.com

MandrakeSoft   http://www.mandrake.com

SuSE Linux   http://www.suse.com

While it is unlikely that Linux needs an official introduction to anyone in the Information Technology arena, we include a small section of information here on Linux and Open Source software for our readers from other industries.

Linux, like Windows XP, is an operating system. Unlike other operating systems however, it is software not written and published by any single vendor. The closest analogy we can offer by way of a conceptual overview, is that Linux and Linux development is closely mirrored by the Internet and the Internet industry.

Linux, like the Internet, had evolved in the hands of technologists over many years before the mainstream business world was made aware of its existence. Also, like the Internet, Linux is in continual development by thousands of organisations worldwide, and tens of thousands of software and systems professionals. Finally, like the Internet, Linux is not presently owned by any single organisation, or can ever be owned by any single organisation. This situation is enforced by the open source licence that Linux is relased under.

Linux, according to IDC (http://news.cnet.com/news/0–1003–200–4979275.html) figures tracking it's growth over the past few years, is the fastest growing operating system platform in the industry. It now accounts for around 27% of all server installs, second only to Windows.

Open Source is a term used to indicate the development and licencing model under which Linux, and many thousands of other platform, productivity and business software are now being produced. In short, the advantages of this style of development are reduced costs of software acquisition (in most instances, the software is free of cost and requires no licence fees) and of equal importance, it offers freedom to business users with respect to their rights of use of the software. More information can be found at http://www.opensource.org/ and http://www.fsf.org/.

Which leads us directly into the reason why Linux provides such a strong showing as a competitor to Microsoft Windows in terms of purchase and licencing costs: it's free. The more users you have using Linux and related technologies, the more you save.

As most people reading this document will likely have used or know abut Windows, there's little reason to include specific information on that platform. As Linux is less well known, we have included the following few pages by way of quick introduction.

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Appendix 5

A Linux Desktop Screenshot
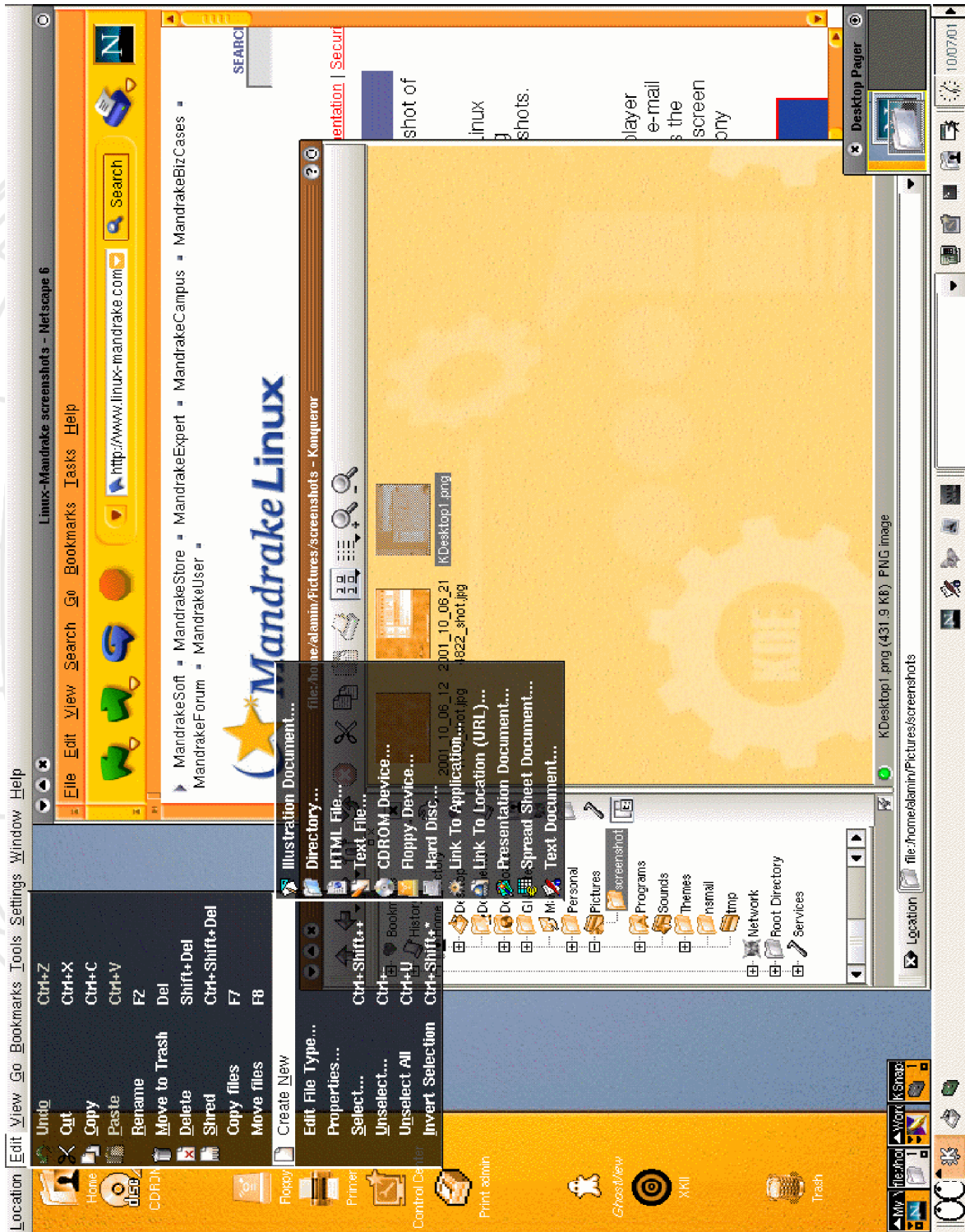
Screenshot used is from MandrakeSoft's website. It's showing a desktop environment of a typical Linux desktop for workstation users. Many Windows users will be familiar with most of the menus icons and launch bar items found on current Linux systems
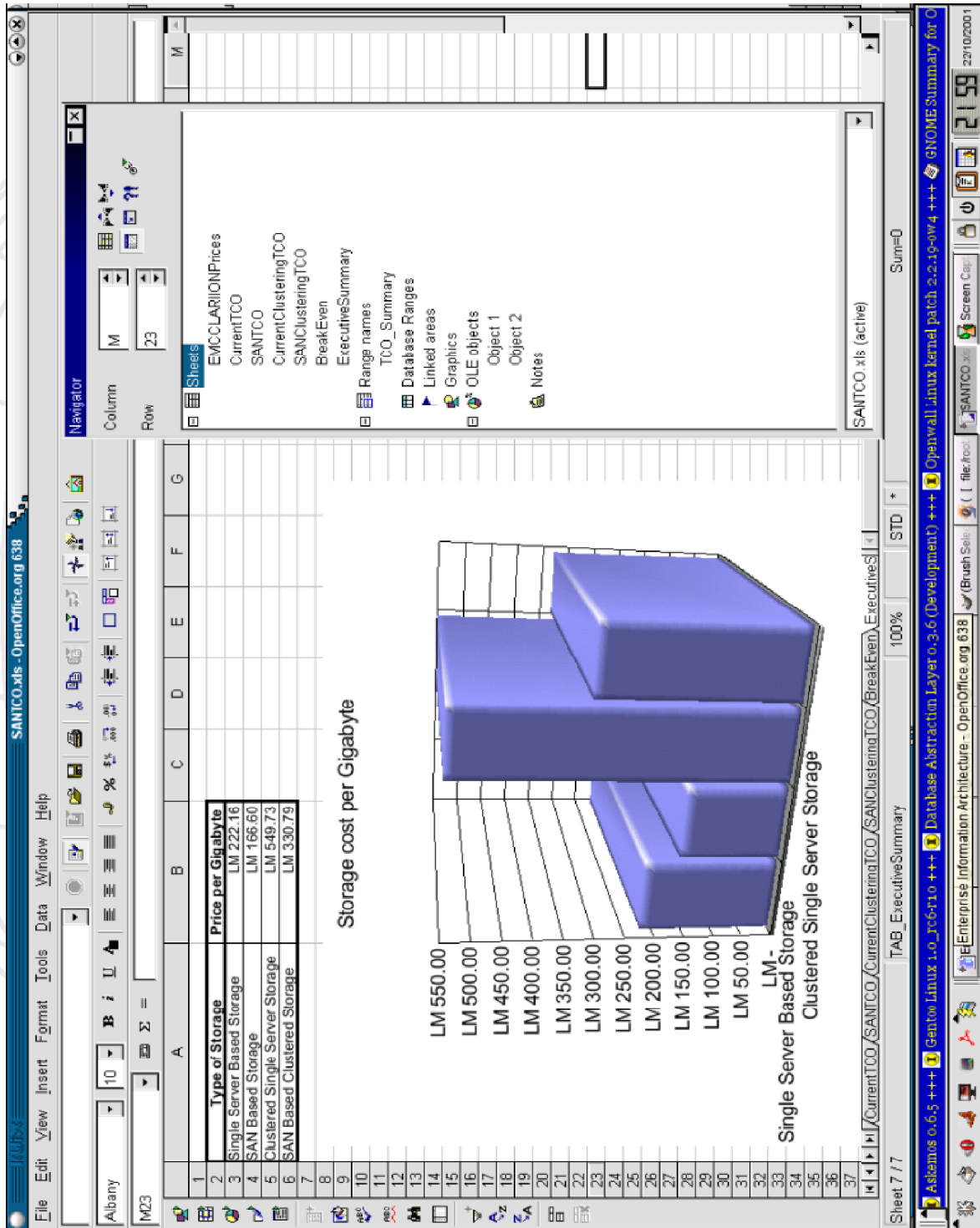
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Appendix 6

StarOffice 6 on a Linux Desktop Screenshot
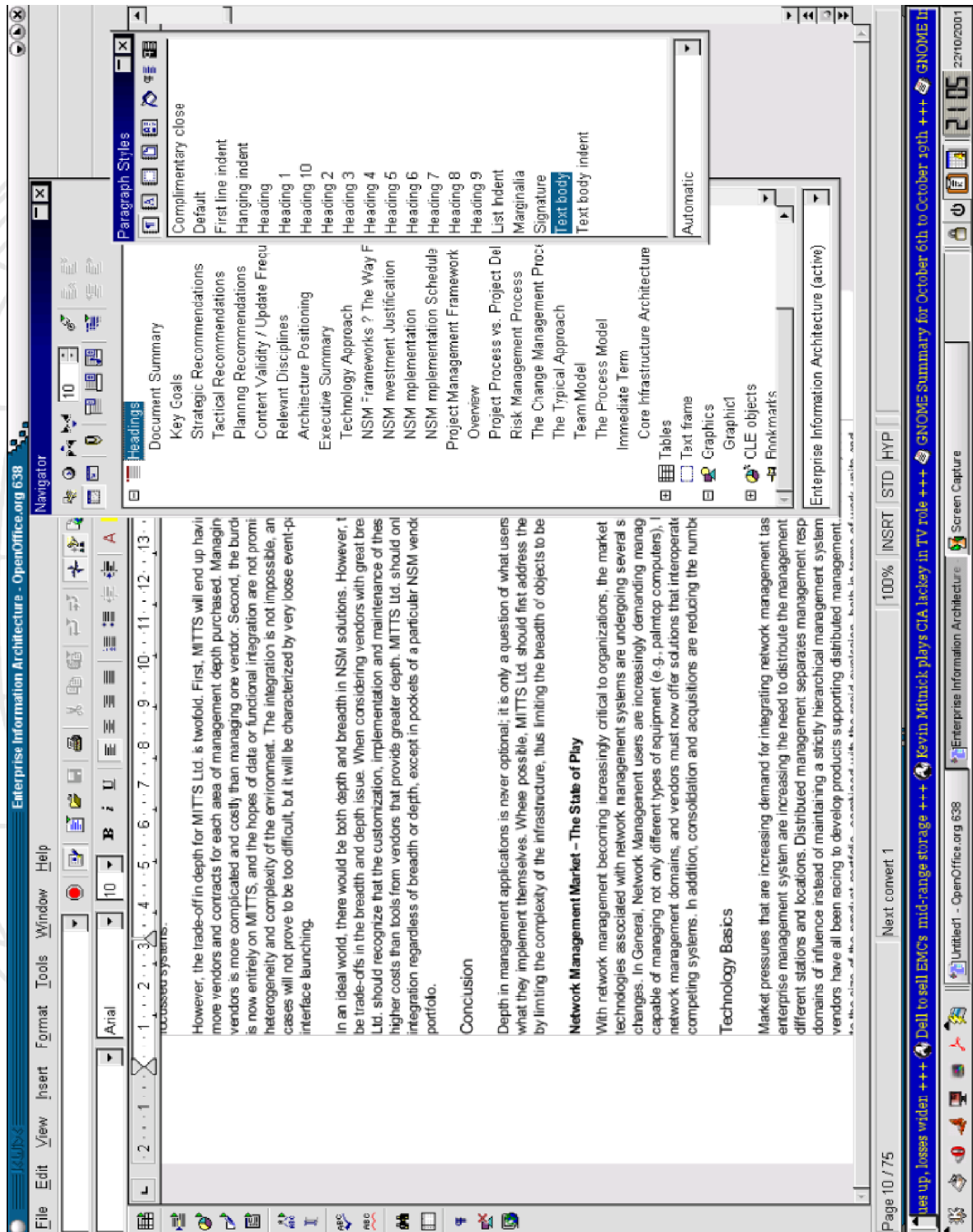
Screenshot used is from the OpenOffice.org website. OpenOffice forms the core of Sun Microsystems' StarOffice office suite, an MS−Office compatible office suite which can interoperate with MS−Office and MS−Office created documents

Appendix 7

StarOffice 6 Spreadsheet

Screenshot used is from OpenOffice.org website. OpenOffice forms the core of Sun Microsystems'
StarOffice office suite, an MS−Office compatible office suite which can interoperate with
MS−Office and MS−Office created documents

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