

Migrating to the Linux Operating System

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Section one : Licensing models

Linux is licensed under the GPL (General Public License) in essence the software is licensed free of charge. Further developments based on GPL licensed software has to be again licensed under the GPL. There are various other licensing models and software has to be examined and evaluated, each according to the software licensing scheme adopted. Open source software does not mean that the software is free.

Section two : Why consider migrating ?

Ownership of your data. Your current licensing agreement :

Does your present license agreement allow the licensor to withdraw your right to use it's software ?

Could your present licensor double or triple the price of your license at any time ?

Under the terms of your present licensing agreement may the licensor decide at any time to discontinue support for your version of it's product ?

If any or all of these conditions exist and considering proprietary data formats, your data is not your property.

TCO Total cost of ownership. The TCO of Linux is significantly lower than any other operating system currently available. This conclusion is fully explained in later sections of this paper where ROI (Return on Investment) and other financial details are analysed in depth.

Technical superiority. Are your current operating systems secure, reliable and scalable ? Performance ?

Example : Samba Fileserver (www.samba.org)

Performance : Samba on Linux outperforms Windows 2000 dramatically.

Scalability : Samba on Linux handles many times more clients before performance reduction when compared with Windows 2000.

Reliability : Reports of a year uptime without 1 second downtime are very common.

Effect : Savings on hardware costs, Savings on software licensing.

(Tests conducted by Andre Coetzee on exactly the same data)

Comment : The implementation of a Samba fileserver is transparent to clients(users)
Windows 2000 is a trademark of the Microsoft Corporation.

Security. Linux files are subject to a permission structure related to specific users on each Linux system. It is also a fact that security exploits in opensource software are addressed at a much faster rate than proprietary software. There are opensource operating systems that have never had a default remote security exploit.

Open source software is under constant scrutiny by many people including those that wish to discredit it because the source code is freely available to anyone.

Who knows how many undiscovered security exploits exist in closed source software and operating systems ?

There are a multitude of other reasons that have to be considered such as vendor lock in, privacy (.NET licensing, conditions and terms of use) and many more which will be dealt with in later versions of this paper.

Section three : Scalability, Performance, Reliability

Scalability of the Linux operating system is well known. Linux is at home on mainframes and personal computers. Linux is good for many things, it was even used in the production of movies like “Shrek” and “Lord of the Rings” and could power your microwave oven.

Performance : Linux delivers superior performance in any independent study. Remember the famous leaked Microsoft memo that admitted a 30-40% speed advantage over a certain product from the Microsoft corporation ?

Reliability : At the end of the day reliability is tantamount. Downtime in an information age can have serious repercussions and could easily negate any TOC calculation. Linux is known to continue working without requiring a system reset for months on end. The Linux file permission system is designed to prevent users and their applications from interference.

Section four : Is migration a social responsibility ?

Because migrating to the Linux operating system has serious benefits to society at large the question whether there rests some form of social responsibility towards individuals and companies to migrate is addressed. In the first part we should perhaps address the benefits more clearly.

1. Curbing foreign exchange outflow.
2. Most Software production based on closed source operating systems are on the application level. By supporting Linux economically in terms of modifications for example, a higher level of programming skill is encouraged locally. This results in society being empowered to become an exporter of technology and not just a user thereof.
3. Society is released from the locked in control of one foreign company.
4. Privacy.
5. A percentage of the money previously spent on licensing fees could now be spent locally. This will strengthen the local IT sector, nurture local software development and improve general IT skills resulting in an empowered community.

As a direct result of the above, society is empowered, educated and allowed to grow beyond any limitation imposed by closed source software, this in turn results in new ways of thinking, exploring and could result in great discoveries.

Therefore we are of the opinion that there are sufficient grounds to state that migration to the Linux operating system is a social responsibility.

Section five : Linux Technical support

1. There are a multitude of Linux user groups all over Africa with hundreds of Linux users ready to provide support free of charge to anyone.
2. The Internet has an answer to any Linux question and there are thousands of Linux user groups all over the world to which any person can subscribe. These Linux user groups assist by providing free support for the Linux operating system.
3. Every facet of the operating system is documented
4. The actual source code is available for anyone to read.

Section six : Financial considerations

ROI (Return on Investment) is commonly used to calculate the financial benefit of a business proposal compared with the costs thereof. ROI is equal to profit divided by capital employed multiplied by 100. The definitions assumed becomes important when using the ROI financial equation to arrive at a particular conclusion.

Basically return on investment is exactly what it says, a calculation that pits the amount of capital employed against the profit achieved in terms of a percentage.

The definitions applied become very important as both profit and capital is affected by a migration to the Linux operating system and fixed values do not always apply across the board.

When defining profit decisions : whether to define it in annual terms, a longer period or weighted average has to be decided.

With defining the invested portion of capital it could be defined as the yearly capital expenditure but should also include recurring expenditure, future integration costs and software updates.

Therefore the ROI calculation is used to establish whether a migration to the Linux operating system is financially viable.

Total Cost of Ownership Linux vs. Other Operating System :

This calculation is generally used for reaching informed decisions on whether to purchase or license any software. It can also be applied in the case of migrational calculations.

In the case of migration to Linux, savings can easily be identified in terms of licensing but definite increases will occur for training and support costs. Support costs on the Linux operating system are higher than other popular operating systems but this demand and supply situation will rectify itself as the popularity of the Linux operating system manifests its continuing strong growth in all sectors.

Gartner predicted that in some markets Linux support offerings will equal or better that of other popular operating systems by 2003.

Migrational costs should also include downtime costs (if any) and other factors related thereto. Then there are massive benefits in terms of the result of additional training insofar as in-house skills are concerned as companies will have the potential of developing their own systems tailored to requirement. Benefits and spin offs such as these are hard to quantify in financial terms.

For the purposes of our example, the total cost of ownership calculation included a financial value for :

- (i)Hardware differences. (migrating to Linux results in fewer servers)
- (ii)All software and additional hardware differences support.
- (iii)All application, other software licensing and development costs.
- (iv)All maintenance and other service costs.
- (v)Financial costs of all yearly license fees.
- (vi)Taxes, depreciations and other costs.

- (vii) Weighted average of future licensing costs for upgrades and product improvements.
- (viii) Downtime (period of non productivity during actual migration).
- (ix) All expected future integration costs.
- (x) Training and all additional training costs.
- (xi) Continuing technical support.
(Linux system administrators administer twice the amount of servers at the same time when compared to other popular operating systems)

After having calculated the above for a mid size company ourselves, based on average industry costs we are of the opinion that Linux offers a minimum savings of 34 – 47 % for companies with 100 plus client users.

We are aware of other TCO calculations as high as 70% in favour of Linux when compared with certain other popular operating systems. Amazon.com reported a decrease of US\$17 000 000 (24%) in the third quarter of 2001 on technology expenditures. (This was after they migrated to the Linux operating system)

Please visit our website at <http://www.lua.org.za> for a web application that assists in the calculation of your organisations total cost of ownership.

Section seven : Migration Phase One : Pre-Migration study

1. Set the migrational goals as a yardstick for measurement of later success.
2. Identify the percentage of reluctant users and note their managerial level.
3. Identify the current security level and evaluate whether this is a core migrational issue.
4. Identify the organisations data and evaluate the structures thereof.
5. Evaluate current IT skills and distinguish between super users and normal users.
6. Identify current applications and prepare a list of replacement applications.
7. Identify potential pilot migrational projects.
8. Evaluate how system downtime has affected productivity previously and calculate the maximum acceptable downtime.
9. Review the current performance of systems and do system allocation.
10. Prepare training schedules.
11. Prepare TCO study considering the points as per our own study above.
12. Prepare an impact analysis based on the collected information.
13. Prepare a risk assessment.
14. Prepare a complete migration report.

Section eight : Migration Phase Two : Initial Projects

1. Implement the pilot projects
2. Evaluate the success of the pilot projects with regards to initial goals.

Section nine : Migration Phase Three : Execution

1. Changes in the Opensource community are very rapid, re-evaluate the migration plan.
2. Evaluate support and system administration skills for readiness.
3. Follow the migrational plan to minimise risk.
4. Execute.

Section ten : Migration Phase Four : Continuing Processes

1. Evaluate applications employed and investigate alternatives.
2. Evaluate platforms and applications used by competitors.
3. Investigate clustering and other performance alternatives.
4. Investigate new ideas and methods of improving productivity.

Section eleven :Crystal ball

Linux has already made considerable inroads as a server platform. Currently Linux is expanding as a client system and suitability on the desktop has finally been achieved. DOS was once freely distributable and DOS was once the most widely used operating system. Linux is GPL opensource.
History is repeating itself and this time the source code belongs to the world.

Section twelve : Linux Distributions – Which one ?

A Linux Distribution is a collection of software that creates a working Linux system. Gnu/Linux is basically a kernel, core libraries, startup scripts, shells, GUI tools etc. The different distributions (Debian, Redhat, Mandrake, Suse, Caldera, Slackware etc.) all have their own quirks as a result of different versions of packaged applications and different default configurations, settings and even modifications to these applications. They use different software applications per default for the same tasks e.g. use of sendmail vs. postfix etc. tasks (with Linux there are large choices) Certain distributions are easier to install than others mainly because of the installers and GUI tools (or lack thereof). Eventually every serious Linux user ends up at the point where the distribution used doesn't really matter and it becomes a question of the amount of work to get it working the way that it is required.

Section thirteen : Replacement software for Linux

Ximian :

Ximian products are excellent for replacing all aspects of client mail software. It even looks and feels very similar to other popular mail software. Appointments and diaries can be shared across the enterprise and it has built in contact management, scheduling and diary functions.

Star Office : Star office from Sun Microsystems offers full interaction with many document types. Microsoft Excel and Microsoft word documents can be opened, changed and even saved again in Microsoft Word or Microsoft Excel format. Star Writer documents can be saved in Microsoft Excel and Microsoft Word formats. HTML, Rtf, Text and other formats are supported. Presentations, Database formats etc. are all supported. Star Office does not have a built in mail client. The Star Office interface looks graphically similar to other popular applications and is very easy to work with if the user has any experience working with for example a word processor or spreadsheet.

Open Office : Very similar to Star Office and should also be evaluated.

For each of the following applications we have named only one example. Please be aware that there are many examples in each category. Even for word processing and spreadsheets there are still many more available applications :

Web Server : Apache, *Mail Server* : Sendmail, *Proxy Server* : Squid,
Stateful Firewall : Iptables, *File Server* : Samba, *DNS Server* : Bind,
Project management : MrProject, *CAD* : Qcad, *Mp3 player* : Ogg Vorbis,
Flight Simulators : Flightgear,
Software to execute Microsoft Windows applications : Wine,
RAD development : Kylix (similar to Delphi) also from Borland,
Fax systems : Hylafax, *DVD and media player* : Xine,
E-mail clients : Evolution (Ximian), *HTML and Programming* : Quanta,
Internet Browsers : Netscape, *CD duplication* : KreateCD, *Database* : Postgresql,

There are many thousands of Linux applications.

Section fourteen : South African case study

Extracts from Canon Business Systems Migration notes – N vd. Walt

The initial migration process started 18 Months ago when we migrated our File and Mail server from Windows NT to Linux. At the same time we moved some of the services provided by a Sco Open Server to the same Linux machine (File sharing, Web server, DHCP). Soon after that we decommissioned the Windows firewall machine, and replaced it with another Linux machine. The final phase only started 6 weeks ago, when 28 Desktop PCs were migrated from Windows 95/98/2000 to Redhat Linux desktops. All 28 Machines were changed over during a period of 5 weeks.

Desktop operating systems were migrated to Redat Linux, and in a few cases Mandrake Linux

Microsoft Office was replaced by the OpenOffice Software Suite

Microsoft Outlook/Express was replaced by a combination of Evolution, Kmail and Sylpheed, depending on user preferences/requirements.

Much more to be added to this section in next versions of this document

Section fifteen : Definitions scope and licensing of this document

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Author and Copyright : Andre Coetzee

Licensing of this document : Licensed under the OpenContent License version 1.0

Scope of this document : To eventually provide comprehensive documentation regarding all aspects of migrating to the Linux Operating System.

a Linux User Association research project, privately funded

This paper has been summarised in many sections to allow for presentation in an allocated time slot. A more detailed version will be released shortly.

Section sixteen : References :

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3. Migrating to Linux from a Mac or Windows Environment : Issues to consider for business – Kevin Cullis (Corel Linux)
4. Beating the Microsoft license - Is migrating to Linux a possibility – Steve Baker
5. Amazon.com to don Red Hat data center – Jaqueline Emigh
6. Migrate from windows NT to Linux – Michael P. Deignan

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Changelist from ver 0.01 :

Carmen Barnes corrected my grammar and presented this paper.