

## Why Linux?

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If you truly enjoy working with computers, Linux is the operating system of your dreams. It is more fun than any other computer operating system around.

However, the reason why Linux is truly revolutionary is that it is Open Software. Our science and technology works owing to the free availability of information and peer review. Would you fly a plane that was based on secret "science" and an un-reviewed design, a plane at the internals of which nobody but the manufacturer could look? Then why would you trust a computer program containing secret parts and algorithms? **Open-source Linux is ideally suited for a mission-critical application--its security and power are based on robust solutions that anyone can view, criticize, or improve on. It is the implementation of the scientific method in computing.**

The making of horseshoes, good glass, or measuring time was once closely guarded trade secrets. Science and technology exploded 500 years ago thanks to the sharing of knowledge by the means of printing. In the early days of printing, many of those who dared to share were assassinated for revealing "trade secrets." **Linux is for the computer age what Gutenberg was for writing.** Hopefully there will be no assassinations this time! Linux does clash with those who claim the "ownership" of information, trying to push time back 500 years.

## Is Linux for me?

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Only you can answer this question. **Linux is a mature, powerful, secure and extremely versatile UNIX-like operating system.** The power and versatility come with a price--you may need to be computer-literate in order to set-up and maintain Linux. **Linux is relatively easy to use** once the operating system and applications are set up properly. So, your mother will also be able to use Linux, if you set up an easy graphical account for her and put the proper icons/menus on her GUI desktop. **Linux is secure**, so your mother will not be able to damage the system no matter how hard she tries--unless it's with a hammer!

## Benefits of Linux

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Linux can give you the following advantages:

1. A modern, very stable, multi-user, multitasking environment on your inexpensive PC hardware, at no (or almost no) monetary cost for the software. Linux is a rich and powerful platform--don't think of it as a "poor people" operating system. **Out-of-box Linux has as much capability as MS Windows NT with \$5000 in software add-ons, is more stable, and requires less powerful hardware for comparable tasks.**
2. **Standard platform.** Linux is VERY standard--it is essentially a POSIX compliant UNIX. (Yes, Linux is a best-of-the-breed UNIX. The word "UNIX" is not used in conjunction with Linux because "UNIX" is a registered trademark.) Linux includes all the UNIX standard tools and

utilities.

3. **Unsurpassed computing power, portability, and flexibility.** A Linux cluster recently (April 1999) beat a Cray supercomputer in a standard benchmark. Linux is most popular on Intel-based PCs (price of the hardware), but it runs very well on numerous other hardware platforms, from toy-like to mainframes. One distribution (Debian) expresses the idea like this: "Linux, The Universal Operating System." **Linux can be customized to perform almost any computing task.**
4. **Advanced graphical user interface.** Linux uses a standard, network-transparent X-windowing system with a "window manager" (typically KDE or GNOME).
5. **Dozens of excellent, free, general-interest desktop applications.** This include a range of web browsers, email programs, word processors, spreadsheets, bitmap and vector graphics programs, file managers, audio players, CD writers, some games, etc.
6. Thousands of free applets, tools, and smaller programs. "Small is beautiful" goes well with Linux philosophy. The small Linux tools and applets often work in tandem to perform more complex tasks.
7. Hundreds of specialized applications built by researchers around the world (astronomy, information technology, chemistry, physics, engineering, linguistics, biology, ...). In many fields, Linux seems like "the only" operating system in existence (try to find out what your friend astronomer runs on her computer). The software in this category is typically not very easy to use, but if you want the power, it is the best software that humanity has in these areas.
8. Scores of top-of-the line commercial programs including all the big databases (e.g., Oracle, Sybase, but no Microsoft's). Many (most?) of these are offered free for developers and for personal use.
9. **A truly great learning platform.** If you are a parent, you should be really glad your daughter/son does Linux--s/he will surely learn something of lasting value. If you are a teacher, you should consider the installation of Linux at your school. "It is indeed a strange world when educators need to be convinced that sharing information, as opposed to concealing information, is a good thing". You select Linux if you care to provide education, not training. The better the university, the greater the chance their computer department uses Linux in teaching. For example, under Linux, you can immediately begin modifying and compiling for yourself a spreadsheet application which is in every bit as advanced and capable as MS Excel. Linux puts you right on the cutting edge (in technology, project management, QA, methodology of science). Many teachers won't use Linux in schools because they are lacking in computer education themselves.
10. **Excellent networking capability built into your operating system.** You think you don't need a network? Once you try home networking, you will

never be able to live without it! How about connecting the two or more computers that you have at home and sharing your hard drives, CDROM(s), sound card(s), modem, printer(s), etc.? How about browsing the net on two or more machines at the same time using a single Internet connection? How about playing a game with your son over your home network? Even your old 386 with Win3.11 may become useful again when connected to your Linux Pentium server and when it is able to use your network resources. All necessary networking software comes with standard Linux, free, just setup is required. And it is not second-rate shareware--it is exactly the same software that runs most of the Internet (the Apache software runs more than 50% of all Internet web servers and Sendmail touches some 70% of all e-mail).

11. Connectivity to Microsoft, Novel, and Apple proprietary networking. Reading/writing to your DOS/MS Windows and other disk formats. This includes "transparent" use of data stored on the MS Windows partition of your hard drive(s).
12. **State-of-art development platform with many best-of-the-kind programming languages and tools coming free with the operating system.** Access to all the operating system source codes, should you require it, is also free. The "C" compiler that comes standard with Linux can compile code for more platforms than (probably) any other compiler on earth. Perl, Python, Guile, Tcl, Ruby, powerful "shell" scripting, and even an assembler also come as standard with Linux.
13. Freedom from viruses, "backdoors" to your computer, software manufacturer "features," invasion of privacy, forced upgrades, proprietary file formats, licensing and marketing schemes, product registration, high software prices, and pirating. How is this? **Linux has no viruses because it is too secure an operating system for the viruses to spread with any degree of efficiency.** The rest follows from the open-source and non-commercial nature of Linux: Linux evolved itself by "bazaar-like" mechanisms to encapsulate the best computing practices, code legibility and correctness, security, flexibility, usefulness, coolness, performance.
14. The operating platform that is guaranteed "here-to-stay." Since Linux is not owned, it cannot possibly be put out of business. The Linux General Public License (GPL) insures that development/maintenance will be provided as long as there are Linux users. There is a great number of highly-educated Linux users and tens of thousands of actively developed projects.
15. A platform which will technically develop at a rapid pace. This is insured by the modern, open-software development model which Linux implements: "build-on-the-back-of-the-previous-developer" and "peer-review-your-code" (as opposed to the anachronistic closed-software model: "always-start-from-scratch" and "nobody-will-see-my-code"). Even if the current "Linux hype" died out, Linux will develop as it did before the media hype started. Open source development does have its peculiarities: the development appears rather slow (vertically) but it proceeds on a very wide front, dangerous security bugs are fixed almost upon discovery, there are typically several alternatives for a program of similar functionality.

Linux depth cannot be overestimated.

16. If you wanted to learn first-hand about the General Public License, check these famous GNU documents:

<http://www.gnu.org/copyleft/gpl.html>

<http://www.gnu.org/gnu/linux-and-gnu.html>

<http://www.gnu.org/philosophy/categories.html#TheGNUsystem>

In a nutshell, the GNU General Public License (GPL) allows anybody to:

- use the software at no charge, without any limitations,
- copy, and distribute or sell unmodified copies of the software in the source or binary form,
- modify, and distribute or sell a modified version of the software as long as the source code is included and licensed under the GPL,
- sell support for the software.

The license under which Linux is distributed is probably the most important part of it. It is designed to perpetuate the freedom of information. Other important open-source projects include science and law (hardly a joke). The Linux method is really nothing new--it is simply the application of the scientific method to software: you get information free, you add your ideas and make your living, and finally, you leave it free. However, some big corporations and their lawyers seem to be trying hard to change this, to push us back in time, to the dark ages, when information was kept "proprietary." Hence, you see in newspapers some famous Linux-connected persons involved in all kinds of struggles.

To get a flavour for the value of Linux, here are some prices for commercial software as listed at [www.amazon.com](http://www.amazon.com). All prices are in \$USA, as listed on 2001-02-03, with discounts. Roughly equivalent Linux software is included on almost any Linux CD (but with no restrictions on the number of clients). In addition, the hardware for Linux is MUCH cheaper, since Linux can run all services on a single server:

Software	Price (\$)
Microsoft Exchange 2000 Server (5-client)	\$1,279.99
Microsoft Windows 2000 Server (5-client)	\$848.99
Microsoft Outlook 2000 (1-client)	\$94.99
Systems Management Server 2.0 (10-Cals)	\$994.99
Proxy Server 2.0	\$886.99
Microsoft SQL Server 2000 Standard Edition (5-client)	\$1,229.99
Microsoft SQL Server 2000 Standard Edition (1-user License)	\$4,443.99
Microsoft BackOffice Small Business Server 4.5 NT (Add-On 5-CAL)	\$264.99
Windows NT Server Prod Upgrade From BackOffice SBS Small Bus Server (25-client)	\$558.99
Microsoft Windows 2000 Advanced Server Upgrade (25-client)	\$3,121.99
Microsoft FrontPage 2000	\$129.99

Microsoft Internet Security and Acceleration Server	\$664.99
Site Server Commerce 3.0 (25-client)	\$4,092.99
Visual C++ 6.0 Professional Edition with Plus Pack	\$525.99
Microsoft Visual Basic Enterprise 6.0 with Plus Pack	\$1,128.99
Microsoft Visual Sourcesafe 6.0 CD	\$469.99
Microsoft Office 2000 Standard (1-client)	\$384.99
Adobe Photoshop 6.0	\$551.99
Microsoft Plus Game Pack	\$19.99

The word "free" has two quite different meanings in the English language, and it sometimes leads to misconceptions about the free nature of Linux. These two meanings follow the Latin adjective "liber" and the adverb "gratis," and they are often illustrated with the phrases "free speech" and "free (of charge) beer." Most Linux software is free in both senses, but it is only the first sense which is essential to Linux.

### **What are the differences between Linux and MS Windows?**

Mouse-click-wise, almost none, once Linux is properly installed. Linux installation can be a challenge though, whereas MS Windows comes pre-installed with your computer.

The major differences:

- **Linux is free, while MS Windows costs money.** Same for applications!
- **Linux file formats are free, so you can access them in a variety of ways.** On MS Windows, the common practice is to make you lock your own data in secret formats that can only be accessed with tools leased to you at the vendor's price. How corrupt (or incompetent?) must the politicians who lock our public records into these formats be! "What we will get with Microsoft is a three-year lease on a health record we need to keep for 100 years" [[http://news.bbc.co.uk/1/hi/english/health/newsid\\_1694000/1694372.stm](http://news.bbc.co.uk/1/hi/english/health/newsid_1694000/1694372.stm)].
- **With Linux, you are unlikely to violate any licence agreement--all the software is happily yours.** With MS Windows you likely already violate all kinds of licenses and you could be pronounced a computer pirate if only a smart lawyer was after you (don't worry, most likely none is after you).
- MS Windows tries to be the "lowest-common-denominator" operating system (for better or worse), whereas Linux is built for more sophisticated, feature-hungry computer users (for better or worse).
- MS Windows is based on DOS, Linux is based on UNIX. MS Windows Graphical User Interface (GUI) is based on Microsoft-own marketing-driven specifications. **Linux GUI is based on industry-standard network-transparent X-Windows.**
- **Linux beats Windows hands down on network features, as a development platform, in data processing capabilities, and as a scientific workstation.** MS Windows desktop has a more polished

appearance, smoother general business applications, and many more games for kids (these are not better games though--Linux games tend to be more sophisticated).

- **Linux is more feature-rich than you could imagine.** Heard on the Internet: "Two big products came from the University of California: UNIX and LSD. And I don't think it's a coincidence."

### **Free Software Philosophy**

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And do you believe in the Internet? The Internet and Linux share underlying ideas and have common roots. Do you remember the disbelief about the Internet a few years ago, the endless, seemingly unbeatable arguments that free Internet cannot exist? "Who pays for that, anyway?"

The reality is simple. Cooperation and good will can benefit many at the same time: **your gain is not my loss**. The Internet works fine and is expanding at a rapid pace. So does Linux.

Here is the opinion of an IBM executive: **"The reason we are so excited about Linux is we believe Linux can do for applications what the Internet did for networks"**

### **"There ain't no such thing as a free lunch"**

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"The economic paradigm which makes this true depends upon scarcity of resources. Software resources are only scarce because we all keep software proprietary and secret. But not Linux! When I give you my software, it may create an opportunity cost for me, but I get to keep it even after I've given it to you. It is a free lunch only rivaled in history by the loaves and the fishes."

### **Commercial Software Manufacturers Can Be Sued, what About Linux?**

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Don't count on suing. Things go wrong on many MS Windows NT machines every day, and there are no damages awarded by courts. Read your MS Windows license agreement to find out that there is no guarantee whatsoever that ANYTHING will work. Trying to sue would be a waste of your money.

Linux also provides no guarantees, although it is far more secure than any version of MS Windows. If you are really security-sensitive, you can use high-security tools built by companies that rely on the availability of the source code to design and test their security features (e.g., Kryptokom in Germany provides high security firewalls). The "security in obscurity" implemented in MS Windows has repeatedly been demonstrated to be a naive approach.

**"Risk aversion is what dictates you use Linux and other open products, rather than NT.** The risks with NT are entirely out of your control, and there is nobody you could sue if anything goes wrong. Why people still believe the myth that Windows in any form offers any bit of accountability "more" than Linux remains a complete riddle to me).

### **Big software corporations (Microsoft) provide standards!**

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Perhaps that's what people would expect from large corporations, but the

reality is rather different. Once, big companies loved inventing nuts that could be undone only by their own service shops. Did these nuts become standard? Hardly. They didn't because there was no public benefit involved, and they couldn't because they were patented. Luckily, now we have open and free standards for nuts. A "proprietary standard" is such a ridiculous oxymoron that it is hard to believe that educated people can believe in it. (Currently, marketing types use the term "de facto standard" or "industry standard" to cover up the ugliness of the lack of standards.)

An example from the computer field. The "standard" MS Word file format has changed numerous times over the recent years. This keeps happening probably for a good business reason: as soon as other companies "reverse-engineer" the current Word format, Microsoft changes it. There are even sub-formats (an MS "fast-save" anybody?). It is also completely closed--Microsoft does not publish any specifications. How can the user benefit from this in a longer term? What is the Microsoft guarantee that MS Word 6.0 file format will still be legible in 2020?

"... Microsoft's standards are both proprietary and arbitrary- the stealth incompatibility of Office 97 file formats with older versions of Office or the subversion of Open standards like XML with proprietary extensions that require Internet Explorer 5, MS Active server and so on, are sober reminders of what the company does to a market." (Xavier Basora, <http://www.osopinion.com/Opinions/XavierBasora/XavierBasora47.html>).

"... Microsoft's monopoly doesn't guarantee that your current MS Office will work with any previous or future MS Office. This is in spite of any number of Microsoft apologists arguing that the benefit of Microsoft's monopoly has been a standard for productivity applications." (Wesley Parish, <http://www.osopinion.com/Opinions/WesleyParis/WesleyParish10.html>).

To add to the confusion, companies typically do not "standardize" on file formats but on the applications that are supposed to produce them. It is like standardizing on a manufacturer of nuts instead of on nuts. How is this supposed to work if the file manufacturer keeps changing the specification to drive their sales?

"We need standardized, open file formats so that users can exchange documents between platforms. The actual word processing software used to generate these documents shouldn't even be an issue." (Ted Clark, [http://linuxtoday.com/news\\_story.php3?itsn=2000-09-29-004-06-OP-MR-0010](http://linuxtoday.com/news_story.php3?itsn=2000-09-29-004-06-OP-MR-0010)).

There are a few text/document oriented file formats that are quite definitely more standard than MS Word file format: ASCII, XML (with non-proprietary stylesheets), HTML, SGML, LaTeX, TEX, PostScript, pdf, dvi ... and all of them have excellent support under Linux. The MS Word file format can also be read/written very well under Linux by OpenOffice (and a number of other applications) to cover your current needs. Advanced, "universal," open-source document formats (XML-based) is being worked on by an independent organization. The story is similar like with other proprietary computing "standards" (\*.giff vs. \*.png anyone?).

**Linux, by its very nature, is based on true, published and free standards because "open source" makes the full specifications available to everybody** (competitors or not). I believe that the urge for open standards is the very driving force behind Linux. Some people feel that they cannot afford to trust their algorithms and data to a commercial entity, let alone one that repeatedly demonstrated it is untrustworthy.

There is a strong perception in the Linux community that there is a serious problem with the computing "standards" championed by large software vendors. This includes their standards for our "static" data, as well as the knowledge embedded in our computer codes. Can we afford to have somebody decide for us when, how, and at what cost we can access our work? This problem is ignored and even aggravated by people who are paid to take care of it. Linux is a grass-root answer.

### **I Need MS Windows for Reading Writing MS Word Documents**

In a large corporate environment, you may have little choice--they locked themselves by cheerful productions of non-portable forms, templates, visual basic-driven web pages and other "tools".

In a smaller environment, you can use OpenOffice.org suit (OO) that runs on Linux, Windows, Mac, Solaris, with full file-level compatibility. It can be downloaded and installed for free (no restrictions whatsoever) so nobody should really complain about the file format (some control freaks still will). Just to make sure, it can import and export MS Word and Excel documents of reasonable complexity very well. However, its native file format is fundamentally much better (and non-proprietary). Feature-by-feature, it can do almost anything MS Office can, plus some extras. Depending on whom you ask, the ease of use varies between "50% more difficult" to "20% easier" (measured on experienced MS Office users). Very complex documents are best transfers as pdf, and OO can make them on the fly.

So, probably you do not need MS Office any more. Download your OO for MS Windows and Linux at: <http://www.openoffice.org/>

### **MS Windows popularity insures that it is "here to stay".**

This is likely true. Nintendo is probably also "here to stay." However, I like computing; therefore, I choose a computer with a powerful operating system, not a lowest-common-denominator piece designed for "everybody."

Linux is quite positively here-to-stay because of its open-source nature (Linux cannot possibly be put out-of-business). It is a standard selected for countless projects that are not going to go away, and some of them are quite "mission-critical." Try the International Space Station, for which Linux is the operating system (<http://www2.linuxjournal.com/lj-issues/issue59/3024.html>).

Plus, never underestimate the strength of the Linux community. Linux is "here to stay" at least for the computer avant-garde. Many Linuxers do not even

want Linux to become very popular because they fear it could "dumb down" the elite Linux platform.

### **Linux is a cult**

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The Linux community has repeatedly been labeled "religious zealots" by journalists whose well-established computer magazines received massive feedback after they had published highly unfair articles on Linux. So yes, the Linux community is numerous, literate, and willing to express its opinions. And many computer journalists/magazines know that Linux means less money for them (users pay less for their computing and the associated advertisement, while expecting more). Does this explain the "zealots"?

Face it, you salespeople pretending to be journalists. There is hardly any integrity left in the computing press. How many words on Linux did your PC Magazine (or whatever) publish by 1999-01-01? Wasn't Linux at least an interesting technology by that time? It surely was, yet you conspired to keep your readership in the dark, selling your journalistic integrity for money. And now, after Linux has surfaced in the mainstream (non-computer) media, you keep writing misleading articles about it saying "yes, but it will/cannot/may ...." whatever (trying the "fear, uncertainty and doubt" tactics to kill it). And adding "Microsoft is already ...", continuing to write about the vapor ware and the future paradise in the face of the increasingly stealthy, unstable, pricey, architecturally unsound computer platform, whose greatest achievement has been exhorting unheard-of-before money by denying inter-operatibility, and killing any existing or proposed standard (by "embracing" and then proprietary-extending it). Whom do you serve? Surely not your readers.

You think "self-serving" is ok in business? How pathetic must your business be! We always thought that business was a social contract in which we exchange good values, for a mutual benefit. As we read history, societies use to hang / guillotine / electrocute those members who really persisted in their self-serving business. Well, times have changed. A bit for the better, a bit for the worse :)))

### **The total cost of ownership (TCO) of Linux is high**

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Nobody really knows how to calculate the "total cost of ownership" of a general piece of software. So a good lawyer + accountant can prove whatever point they are paid to make, and they regularly do.

Let me try a simple estimate of how much the average total cost of the ownership of MS Windows is. Let's add the fortunes accumulated by all the MS Windows software makers. Add all the salaries of all generic Windows programmers, consultants, support and training personnel, IT management, etc. Now, add the losses customers must surely have suffered while the software corporations were presenting them with "features" so as to achieve their current monopolistic status. Divide this figure by the number of years (whatever timeframe you selected), and the number of MS Windows users (only in the countries in which software is normally paid for). Here is the TCO of MS Windows. However you count it, it will be many thousands of good US

dollars per average joe per year. You didn't pay that much money? Well, you must have, it has just been hidden from you. Yes, developed countries waste billions every year on software.

**How much did Linux cost? Hardly anything. The number of users is much lower, too, but you will be hard pressed to come up with \$10 per user per year.**

Yet, in our opinion, the total cost is not what matters the most. What value did we receive for my money? You would have to calculate the total value of ownership (TVO?), then subtract from it the total cost of ownership (TCO) to obtain the "net benefit of the ownership."

We guess accountants only talk about the TCO for software "necessary for doing business," and thus skip the issue of value and benefit. There is no value in the normal commercial software, it is just the necessity for doing business these days. Well, Linux satisfies my computing necessities at zero monetary cost, and the personal pleasure and learning value is just great.

**Linux is idealistic "dreaming"; it is business that rules the world nowadays**

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Think of Linux as a consortium. Businesses/individuals get together to address a common computing need or problem. They may chip in labour or money, hire a technical leader, or otherwise cooperate to make Linux address their requirements. The solution is totally theirs for keeps, and it does not have to cost a lot--they can re-use the pre-existing Linux software pieces. They may cooperate to overcome the advantage that a big "industry leader" may have and use against their interests.

Linux is the end-product of activities of many such loose "consortiums" who "scratch their needs." So Linux is a business, but it is not necessarily about selling software--it is about access to reasonably-priced software that matches your need, solves your problem, sells your hardware or service, and which is totally yours (the license never expires, and you will never be cut off from the source code).

## **Summary**

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### **Strengths:**

- Low on the cost of hardware
- Very powerful
- Feature-rich
- Highly configurable
- Flexible (comes with complexity)
- Linux is highly standard (UNIX, POSIX)
- Open file formats used all along
- Linux is owned by its fans (your piece of ownership comes free with your free subscription to the fan club),
- Thousands of programs available for free download (although the ease of

use and quality of these varies vastly).

- Comes with any networking bell-and-whistle known to man
- Linux is enjoyable

**Weaknesses:**

- Requires a computer literate administrator
- Some essential desktop applications are still behind commercial offerings on other platforms (e.g., spreadsheet and word processing)
- A number of excellent end-user applications come "standard" and free with the operating system
- The graphical user interface is very nice but still not as polished as Apple or MS offerings