



November 22, 2002

No. 32

conomics

Internet revolution and new economy



Free software, big business?

Open-source programs tightening their grip on industry and the public sector

- The freely available operating system Linux – a so-called open-source program – has reached a **level of sophistication** putting it at least **on a par** with the quality of its proprietary rivals by Microsoft, Sun and other providers.
- In addition to Linux, a raft of **other programs used widely by the corporate sector** are meanwhile available as open-source versions (office packages, database programs, knowledge management software etc.).
- **Interest** in open-source software is growing rapidly **in industry and government agencies** in response to the demonstrable cost benefits and presumed advantages in terms of stability and security. Although Linux' market share is small, it is advancing fast. **Enormous growth rates** are forecast for Linux in the market for server software.
- So far Linux and the service that goes with it have been offered mainly by **small-scale service providers**, whose business situation is still precarious. Many fell victim to the bursting of the stock market bubble in the New Economy. Those that survived are striving to **standardise their software** to increase their attraction for the business world.
- But **IT heavyweights** such as IBM, Sun, Oracle and SAP are also increasingly looking to **Linux as a growth catalyst** for the important server market and as a weapon against the hegemony of Microsoft.
- It remains to be seen who will continue to develop open-source software in future. The driving force so far, the "honorary" **community of open-source programmers**, could **lose interest**. IT corporations will have to invest in development but will probably remain **dependent on free programmers** to maintain previous standards of quality.
- Also, classical **software companies** could conceivably **lose massively in innovative strength** as a widespread distribution of open-source programs could create a shortage of lucrative licensing agreements for their proprietary products.
- All in all, open-source software could offer **financial services providers broad scope for internal optimisation**. Moreover, open-source competence could become a significant **criterion for company ratings and investment decisions**.

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Free software, big business?

The US Open, a world-ranking sports event, had a new mascot this year – a penguin. But instead of embodying features characteristic of the sport or country, the cute creature proclaimed that IBM, the biggest information technology (IT) group in the world, was using the Linux software system for its entire data processing of the match coverage. Linux is a freely available technology developed by a loose community of programmers dotted around the globe, working without design specifications or recompense and coordinated through the internet.

This is remarkable in two respects. First, it marks the application of this technology in a sensitive, widely visible area of the world of sport – and hence of business. Until not so long ago, Linux was used mainly by dedicated system administrators at university computer centres. Although considered comparatively efficient, because of its unusual genesis its application called for considerable insider knowledge and commitment by its users. This seemed to make it largely uninteresting for an efficiency-focused business environment.

Second, in the past the Linux operating system reached its users mostly through start-up IT service providers – if commercially at all, given that it is freely available in the internet. With its high-impact use at the US Open, one of the industry giants – IBM – was coming out openly in favour of this free rival product to the proprietary software from Microsoft and Sun, the market leaders for server operating environments.

This commitment to an open-source program, whose blueprint, i.e. its source code, is generally available and can be redistributed by anyone and used without licence fees, may come as a surprise. After all, most of the firms that set out to make a profit by offering services related to software products of this kind were overtaken by the typical New Economy fate even more swiftly and severely than other start-ups during that period. The “open-source business model” appeared to have failed, with very few exceptions.

Meanwhile, however, IBM has built up a substantial Linux customer base, recently announcing the acquisition of illustrious new accounts. And it is not the only IT heavyweight with a massive Linux commitment. In April the penguin also penetrated the world of investment banking, with the migration of Credit Suisse First Boston’s global trading system to the Linux environment.

Why are industry giants turning to open source? Is non-proprietary software becoming big business? What advantage does it have for the user? The following article illuminates the background, analyses current trends in the open-source market and highlights potential implications for financial service providers.

Too many cooks do – not – spoil the broth!

The term open-source software is used to denote computer programs whose source code – the program “mechanics” described in a programming language that software developers can understand – is freely available, modifiable and extendable for everyone. To make sure this is the case, the developer who writes the program or its initial lines secures the copyright and releases the software for general use, modification and further distribution (the latter also being possible for

IT industry heavyweights moving into the Linux business

“Open-source business model” already appeared to have failed

Growth in the number of businesses using Linux

Open-source software cannot become proprietary...

a fee) with the aid of a “free software licence”¹. This licence also ensures that all redistribution by a licensee, with or without modification, is permitted only on the basis of the same licence. In other words, it is legally impossible to convert the program into a proprietary product – into software, that is, whose source code is not freely available.

The development of open-source software is supported not by individual programmers or teams bound to any one organisation, but by “communities” – loosely organised, often geographically widely dispersed groups of software specialists – on a voluntary and unpaid basis. Usually the basic structure and core of the software is created by individuals or small nuclear groups. The source code, which is unfinished from the point of view of classical software development, is then published under free licence. This enables other developers to participate in the project by identifying errors, making improvements and developing extensions.

In most cases the developers are presumably motivated by a mixture of love of programming, striving for reputation among their peers, commitment to opposing the restrictions of proprietary, and the conviction that a program developed by a large community is superior in quality to its proprietarily developed and copyrighted counterpart. Many pairs of eyes see more solutions and errors than a few. Open-source software is therefore considered – not only by the developers involved – more failsafe and better protected against computer viruses and similar onslaughts.

Linux is not alone

Linux, although familiar to a wider audience, is not the only software to have arisen this way. In addition to programs for the management of web offers, database software and knowledge management systems, various software packages imitating the functionality of Microsoft’s widespread Office product have since been developed (e.g. OpenOffice, gobeProductive, KOffice).

Established companies, too, are increasingly coming to recognise the advantages of publishing their own source codes. The investment bank Dresdner Kleinwort Wasserstein has released the source code of internally developed software connecting different in-house computer systems in the hope of speeding up further program development and better cooperation with clients, who can now refine on the software for their own purposes. The IT house Oracle intends to make parts of the source code for its successful database software available to the developer community under a free licence. And even Microsoft releases the source code of its Windows operating system to key accounts as part of its Shared Source initiative to improve the feedback between developers and users (Microsoft does, however, prohibit any further use or modification whatsoever).

Innovation in a low key?

But all these positive aspects should not cloud the view for the fact that so far the open-source movement has produced scarcely any innovations providing users with *functionality not previously available*. Here a comment from the community²: “Apart from the fact it’s easier to copy than to truly innovate [...], it’s also the case that people want

... is refined on by large, loosely associated groups of programmers...

... and thus often matures to a higher quality than its proprietary competitors

Growing range of free software becoming available

Thus far, open-source software has delivered hardly any innovative functions...

¹ In most cases the GNU General Public Licence is used. This can be viewed at <http://www.gnu.org/licenses/gpl.txt>.

² Excerpt from a reader’s comment dated September 7, 2002 in newsforge.com, an online medium for the open-source community.

Free versions of commercial software they find useful. Until it comes to be the case that most useful software that is produced is Free, then the Free Software community will always be doing more copying than innovation.”

In fact, though, this is hiding developers’ light under a bushel. Providing new functionality is just one of many ways of product innovation. Generally, innovative solutions are needed to make a familiar function more failsafe and virus-resistant. And precisely this is one of the pivotal merits of the open-source community.

But open-source developers’ focus on this kind of innovation does mean that any possible contribution by free software to the enhancement of productivity for companies, and indeed – in a rather bold extrapolation – for entire economies, presumably lies mainly in cost reduction. The simplification or acceleration of processes through entirely new software functions is – so far at least – hardly to be expected from open-source programs.

The classic open-source business model

But how can money be made with a product that anyone can access free of charge? Until recently service providers – small businesses for the most part – adapted, extended, bundled, implemented and administered open-source software for their clients. Although it is possible to charge for distribution under open-source licences, the price that can be obtained is naturally not comparable to that for licensing proprietary software. That is not the purpose, though. The objective is to win clients by providing low-cost or complimentary software and subsequently to generate earnings from the delivery of services to them. There is, after all, no high development expenditure to recoup before reaching break-even point – the classical procedure in the software industry.

On the other hand, open-source providers, unlike classical software firms, do not benefit from the attractive combination of low marginal costs and the often juicy licensing fees that can be obtained with a commodity such as software.

Advantages from proprietary and cooperation?

The most successful proponents of this kind of open-source service provision in the Linux market today are the US company Red Hat, the German provider SuSE, France’s Mandrake-Soft, China’s Red Flag and Conectiva in Brazil. But a large number of other new firms set up to make money with open-source software, many of them in the New Economy boom, have long since gone under. Many failed to survive simply because their clients were also start-ups doomed to extinction.

To hold their ground in the open-source market, the survivors are testing new strategic options. Some of them are combining free with proprietary software. Red Hat, for instance, has added proprietary components to the latest version of its Linux package. A year ago already, the VA Software Corporation, once the flagship of the open-source business world, opted to offer its hitherto free software for the management of open-source projects (SourceForge) to companies in combination with supplementary proprietary programs.

... but often innovative approaches on existing functionality

Classic business model based on product bundling, distribution and service

Small open-source suppliers increasingly distributing supplementary proprietary products...

Both companies are looking to secure earnings with this strategy. Even though Red Hat is now the leading Linux provider with a market share of 52%³, in fiscal 2002 even this company barely broke even – one-off effects aside – and last year it still turned in a loss. VA Software is still operating in the red.

To counter the dominance of Red Hat, the smaller providers have developed a different strategy. Some of the most prominent – SuSE, Conectiva, The SCO Group and TurboLinux – have joined forces under the roof of the United Linux initiative with the aim of standardising their hitherto different Linux versions. The standardised Linux creates synergies and could have a confidence-building effect on customers. However, it is still too early to assess the actual implications of this step.

Old arguments, new figures

From the point of view of a customer or user, what are the arguments for and against open software? There is one obvious reason for using free programs in preference to proprietary software – the former costs nothing or comparatively little to procure⁴. What is more, Linux in particular is now considered comparatively stable and virus-safe. And last but not least, in many areas of science and public administration Linux is perceived as politically correct, being freely available and also devoid of any monopolistic tendencies whatsoever. Many people see the Microsoft Corporation's quasi monopoly as the reason for a lack of pressure to improve quality and pricing in the sector.

A classical argument against the use of free software, particularly in business, was that the suppliers or service partners were unsafe because they were too small. Also, it is thought that low acquisition costs might conceivably be over-compensated by high service expenditure, given the lack of standardisation in this sector. Finally, many people point to an inadequate spectrum of functions in comparison to proprietary competitors.

The unsafe service partner argument is, however, being overtaken by current market developments, as industry heavyweights enter the arena (see below). There are new findings on the cost argument as well. In a recently prepared, IBM-backed study, the Robert Frances Group identified Linux as by far the most economical operating system for business servers. Apart from the licence fees, in a corporate survey the costs of implementation, operation and support were compared for the Microsoft Windows system, Sun's Solaris (Unix) System and Linux. It emerged from this that Linux' support costs were also comparatively low.

Goliaths learn to love – and hate - Linux

The pro-Linux arguments appear to be gaining massively in clout with industry meanwhile. It is not only still-small players such as Red Hat or United Linux that are looking to capitalise on this. Indeed, hardware heavyweights such as IBM, Sun Microsystems and Hewlett Packard are investing massively so that Linux can operate on the environments they offer. All three sell hardware for server systems – the electronic brains behind web offers and big databanks.

... or joining forces to get out of the red

Pro-open-source arguments on the advance,...

... arguments against are being put into perspective or corrected

Server costs for different operating systems (in USD 1,000)

	First year	Third year
Linux	50	74
MS/Windows	92	191
Sun/Solaris	422	562

Cost of licences, implementation, operation and support for server systems (total cost of ownership)

Source: Robert Frances Group, 2002

³ IDC (2002), *Worldwide Linux Operating Environments Forecast and Analysis, 2002-2006: A Market in Transition*.

⁴ Open-source software is usually available free of charge, although many commercial providers sell specially bundled or adapted versions. But as a rule the prices are significantly lower than for proprietary software.

These days servers are perceived as the growth market *par excellence* of the computer industry for hardware and software, given that the market for personal computers (PC) is practically saturated. According to an IDC study⁵ Microsoft Windows is still the foremost server operating system, with 49% of the licences sold in 2001. But with a market share of 25%, Linux has already overtaken its previously overriding proprietary "sister", Unix, which – like rival NetWare – now accounts for barely 12% of the licences issued⁶. Windows was the only system in 2001 to post growth year on year (of 7%), Linux held steady, while Unix and NetWare both dropped 3%.

In terms of systems installed the world over (irrespective of the time of delivery) Linux still brought up the rear in 2001 with a market share of well below 10%, trailing Unix and NetWare (both just over 10%) and way behind Microsoft (almost 70%)⁷. In comparison to the previous year these numbers reflect slight relative declines for Unix and NetWare and a relative uptick for Windows. But for Linux they signal no less than a tripling of market share.

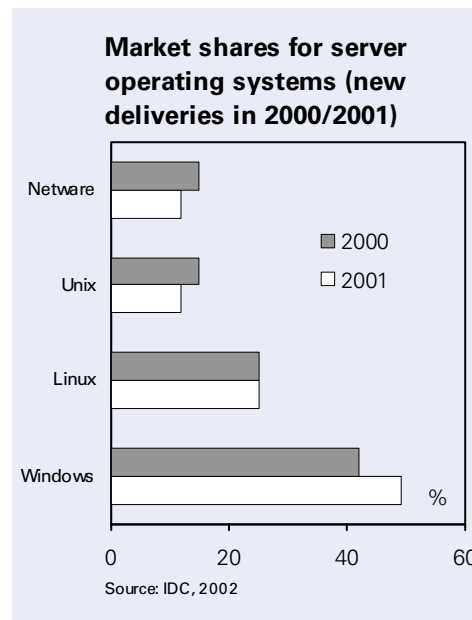
It is not therefore surprising that the IT industry giants perceive enormous growth potential in Linux-based systems. They view Linux primarily as a catalyst for their core business, the sale of computer hardware and, increasingly, IT-related services.

This business model appears viable. Indeed, IBM recently announced the signing of another ten key accounts for Linux-based server systems. They enhance IBM's existing portfolio of 4,600 clients using Linux as the operating environment for their web or database servers. To bolster this trend, IBM even grants its clients a discount when they opt for Linux as an operating system in preference to other systems from IBM's own range. Hewlett Packard is likewise intensifying its Linux activities, developing new software for its own Linux server systems.

In addition to these major hardware and service suppliers, the world's biggest supplier of database software, the Oracle Corporation, and SAP AG are also branching out into open source. Their products, widely used in industry, can now also be run on Linux computers. Oracle recently signed a cooperation agreement with Dell and Red Hat; together they now offer a Linux server complete with hardware, operating system and databank software. For Dell, too, traditionally at home in the PC and laptop sector, servers represent a promising market of the future.

But the big new Linux supporters IBM, Hewlett Packard, Dell, Oracle and SAP presumably view the free operating system as more than simply a direct catalyst in the battle to secure market share. More importantly, a massive advance by Linux could break the tight grip that Microsoft and Sun have on the market, with Microsoft's predominance in the field of operating systems for standard servers (Windows) and Sun's in the high-power server sector (proprietary Unix version called Solaris). If Linux can be turned into an economical mass platform, companies would be able to spend more on hardware, application software and services. These, and not operating environments, are the very areas in which the new espousers of Linux earn their money. Linux would thus help not only to reapportion the cake, but to enlarge it at the expense of profits in the operating system sector.

IT hardware manufacturers use Linux as growth catalyst



Big business software suppliers turning to Linux

Linux as a weapon against the tight grip of Microsoft and Sun

⁵ IDC (2002). *Worldwide Client and Server Operating Environments Forecast and Analysis, 2002-2006: Microsoft Extends its Grip on the Market.*

⁶ Sun, IBM and HP all sell their own proprietary Unix versions.

⁷ Gartner Dataquest, April 4, 2002.

Sun itself pursues a twin-track strategy, expanding its previous high-end Solaris server operations by penetrating the low-priced Linux server market. Indeed, Sun has reorganised a significant part of its business for this purpose. Linux therefore constitutes a threat and a weapon alike for Sun.

Linux a threat and weapon alike for Sun...

Not so for Microsoft. As far as the market leader in PC operating systems is concerned, Linux threatens its plans for further expansion in the market for server operating systems. Consequently, Microsoft has singled out IBM and Linux as its two pivotal challenges.

... for Microsoft, purely a threat

Microsoft's market share could come under particularly serious threat from various national and regional initiatives designed to promote the use of open-source software in public administrations. As a buttress against possible inroads into its turnover, Microsoft has joined forces with the chip manufacturer Intel, its longstanding ally, and some smaller IT companies in a counter-campaign entitled Initiative for Software Choice. This cautions against a distortion of competition to the detriment of proprietary software should the open-source initiatives be successful.

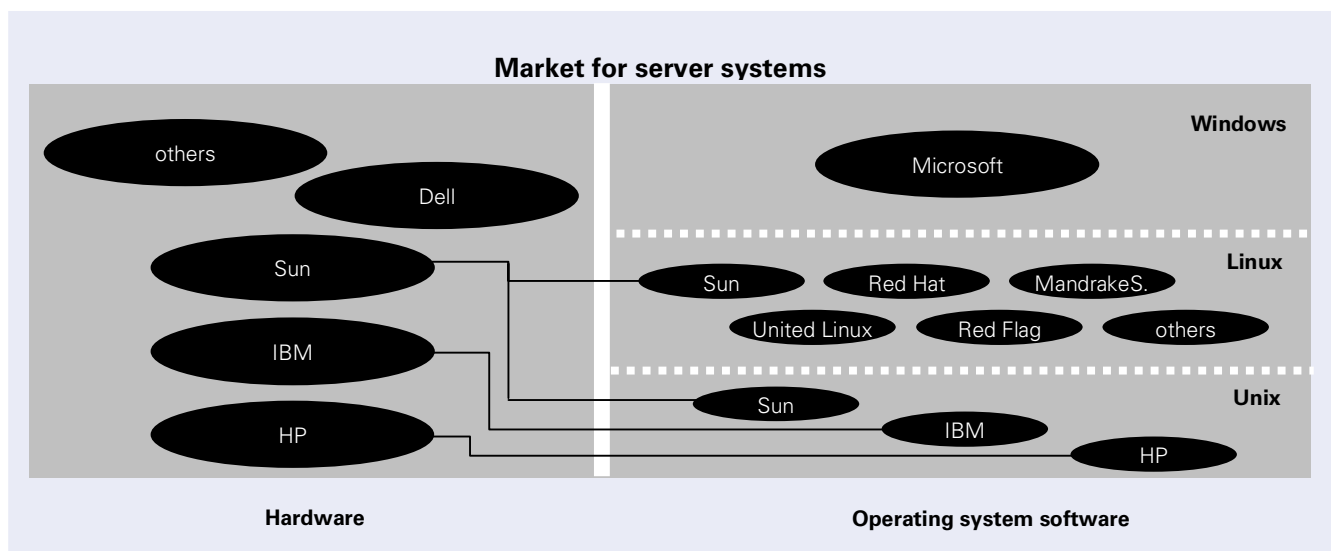
The public sector as market-maker

According to the Initiative for Software Choice more than 60 government initiatives, studies and statements currently exist in 25 countries designed to foster the acceptance and use of open-source software, mostly in government agencies.

This was presumably set in train by the publication two years ago of a study by the European Commission. It credits open-source software with the potential to combat the supremacy of US software products and Europe's consequent reliance on imports in this area. Moreover, last July the EU Commission called on the EU member states to use common open-source programs as a means of cutting costs.

The initiatives are evidently having an impact. Germany's interior minister, Otto Schily, has closed an extensive cooperation agreement with IBM for the distribution of Linux in German public authorities. Germany's federal office for IT security (Bundesamt für Sicherheit in der Informationstechnik) has awarded a contract for the development of an open-source program to support teamwork. The Norwegian government decided in July 2002 to focus on free software in preference to renewing its contract with Microsoft. Similar trends are evident in France and China.

Ever more countries in favour of open source in public administration



Lobbyists for the open-source movement in the United States have submitted a bill that would prohibit the entire state of California from procuring proprietary software for the public sector. And together with Hewlett Packard the US marines are examining the possible use of open-source software in their administration.

Status poor, outlook rosy

The turnover that Linux providers generate simply through distribution⁸ of the operating system does not reflect this positive trend at the moment. According to an IDC study⁹, after two years of growth it shrank 5% from 2000 to 2001. But with the exception of Microsoft Windows, sales of which expanded during the same period, Linux still outperformed its rivals. All told, the market for server operating systems contracted by about 1% yoy. Red Hat (USA), Red Flag (China) and Conectiva (Brazil) had the biggest Linux market shares. In the coming five years IDC forecasts average annual growth of 28% in Linux turnover, which would mean a jump from USD 80 million in 2001 to 280 million in 2006.

Paradigm shift on the desktop?

Linux' desktop presence – as an operating environment for personal computers – is still conceivably weak in comparison to the server sector. According to IDC research, in 2001 Linux was installed on only 2.7% of all PCs worldwide. One reason for this low market share is probably its lack of a unified appearance. Unlike for Windows or Apple's Macintosh OS, there are various user interfaces for the Linux System, none of which has so far managed to establish itself as a quasi-standard. While the community of Linux developers and enthusiasts welcomes this diversity, analysts see it as an impediment to the success of Linux with the average computer user.

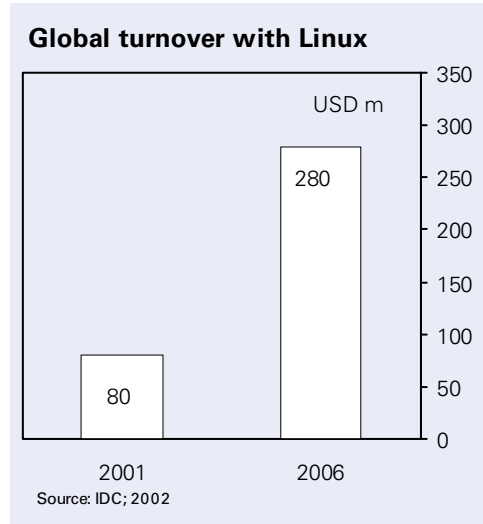
In fact, Linux market leader Red Hat has taken the first step towards standardisation by merging the two predominant user interfaces KDE and Gnome. What is more, Linux could receive support from an unexpected source, as on the server side: The new licensing conditions for corporate and other key accounts introduced last year by Microsoft automatically push up the costs for licensees. According to market research by the Yankee Group, 38% of the companies polled are now considering cancelling their licensing agreement with Microsoft.

IDC estimates that the number of Linux desktop systems delivered between 2000 and 2001 actually soared by nearly 50%. But in terms of the spectrum of available applications and their functionality, Windows is still far superior to its rival Linux in the desktop segment. It is questionable, though, whether and/or how long this supremacy can be sustained.

And who will continue developing?

So there is much to suggest that in years to come free software will gain further in economic importance. This is probably also in the interests of many of the programmers who have so far helped develop open-source programs without compensation. First, the virtual

Strong growth forecast for Linux servers in years to come



Still scant Linux market presence on the desktop...

... but first steps to promote distribution

⁸ They sell user-friendly packages of what are actually freely available software components. Moreover, users of freely available versions have to make do without support and usually also without manuals.

⁹ IDC (2002), *Worldwide Linux Operating Environments Forecast and Analysis, 2002-2006: A Market in Transition*.

monopolist Microsoft's market power could be clipped and, second, the developers are acquiring know-how that, as the programs they have developed become economically more significant, can increasingly be turned to financial gain.

After all, the IT industry is in urgent need of their skills and expertise. Already the industry heavyweights mentioned are investing heavily in Linux and gearing their development and marketing strategies and their organisational structures to the environment. They will therefore have no choice but to take over at least part of the software's further development themselves; it is hardly conceivable that corporations will place the ongoing development of one of their pivotal business platforms in the hands of an independent and self-willed community of developers.

It may sound rather ironic that these companies will have to invest massively in something they cannot copyright. The free software licences originally distributed are inseparably linked to programs like Linux, and as a result all investment-intensive improvements by the staff of IBM, HP or Sun must be universally and freely available. And a "proprietary imitation" of a product like Linux – which would entail radical reprogramming – is almost out of the question given that the special genesis of open-source software is the reason for its comparatively high quality.

It is for this very reason, however, that simply pumping investment into in-house development capacity will not suffice to maintain the previous standard of quality when further developing programs such as Linux. For this, the industry will need the continuing commitment of the free community of developers. But it is difficult to assess their level of motivation to continue working unpaid on open-source projects, simply for kudos and the acknowledgement of their peers. After all, others are earning more and more money with their ideas and time.

The IT industry will therefore have to seek judicious and discreet ways of encouraging and supporting free developers. That their biggest convention, LinuxWorld, was transformed this year from a once popular happening for enthusiasts into a business-minded technology fair, did not meet with a very positive reception from the community at least. And IBM's recent technological support for the much-used open-source developer platform sourceforge.net could be interpreted as undesirable infiltration. The Free Software Foundation has already taken the precaution of setting up its own developer platform, which it intends keeping free of commercial interests¹⁰.

Implications

The open-source movement has triggered a raft of economically relevant developments, briefly outlined in this article. Various implications, also for the financial services sector, are obvious:

- Open-source software holds out the prospect of massive potential savings on IT, particularly on servers. Under mounting pressure of costs, this possibility should not be dismissed out of hand. Although open-source products do not yet provide the customary functionality in desktop software, swift catch-up with their proprietary rivals is likely.

IT corporations must develop Linux further...

... but cannot copyright their developments...

... and still need free developers to maintain the standard of quality

Open source could reduce costs,...

¹⁰ <http://savannah.gnu.org>; see article in heise.de dated August 13, 2002.

- What is more, contrary to the opinion still widespread in companies a few years ago, Linux is now at least on a par with – if not superior to – its proprietary competitors in terms of stability and security. Improvements in this sphere could decisively boost efficiency. Global players should take care not to fall behind their industry peers in this respect.
- Also conceivable is the release of hitherto proprietary software developed in-house, either exclusively to partners or to the entire developer community. Various companies are already exploring this new avenue for program optimisation and development.
- The ability to address the open-source challenge pro-actively and turn it to productive advantage could become a pivotal success factor in the IT industry. IT companies' capabilities in this area will thus constitute an important rating criterion.
- The widespread use of free software in science and government agencies could possibly relieve public budgets significantly.

Notwithstanding this potential, it should not be forgotten that the innovative drive for open-source development has lain thus far in the search for alternative and better ways to functionality already familiar from other products. But sustained, productivity-enhancing innovation must also recognise problems or needs that have not already been addressed by other solutions and accommodate them with functionality not otherwise provided.

The major contribution to this has been made so far by companies that fund their enormous R&D expenditure with licensing revenues from proprietary products. Were their proprietary products really to be ousted by open-source software, this avenue of funding would dry up and funds would possibly be lacking for R&D investment. That open-source software could fill such an innovation gap in the long run is to be hoped for – but by no means certain.

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... boost efficiency...

... help optimise own programs,...

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... and relieve public budgets

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Printed by: HST Offsetdruck Schadt & Tetzlaff GbR, Dieburg.

Print: ISSN 1619-3245 / Internet: ISSN 1619-3253