RACONTEUR

This is an independent publication by
special interest media company Raconteur

_ 23. October. 2012

Distributed in THE TIMES

Publisher Daragh McDowell

Editor Eric Doyle

Design The Surgery

Managing Editor Peter Archer

CONTRIBUTORS

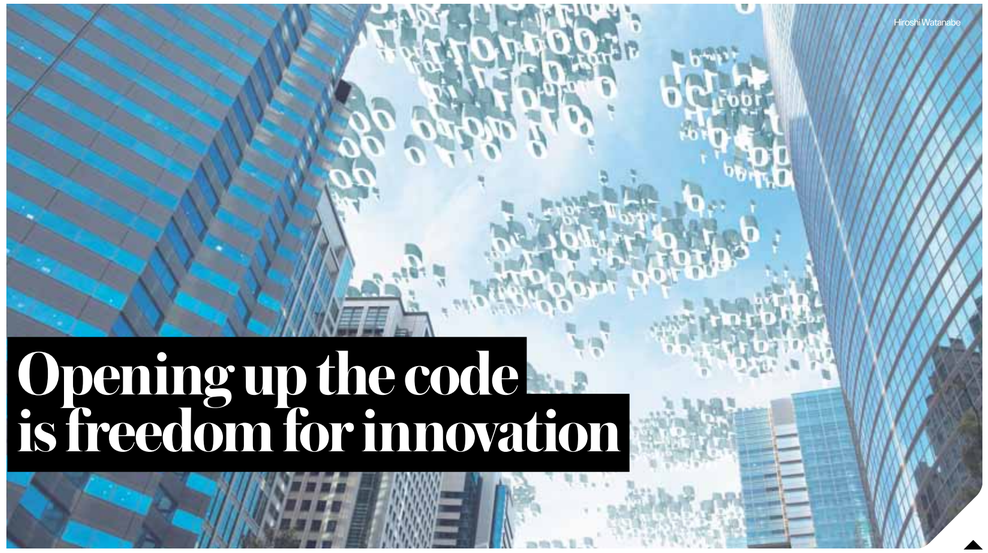
MARK BALLARD
Freelance journalist, who covers computer policy, business and systems, he writes *Computer Weekly*'s public sector IT blog.

ADRIAN BRIDGWATER
Specialist author on software engineering and application development, he is a regular contributor to *Dr. Dobb's Journal* and *Computer Weekly*.

BILLY MacINNES
Editor and writer, he has written about the technology industry across a wide variety of publications for more than a generation.

RICHARD HILLESLEY
Freelance writer on Linux, free software and digital rights, he is a former editor of *LinuxUser* and now contributes to *Tux Deluxe* and *The H Open*.

ROD NEWING
Freelance business and technology writer, he contributes regularly to the *Financial Times*, *The Times*, *The Daily Telegraph* and *The Washington Post*.



The cloud, big data analytics, smartphones and tablet computers rely on open source

Opening up the code is freedom for innovation

Developed by a community of volunteers and made freely available, open source software is attracting attention and challenging proprietary packages, writes **Rod Newing**

10.3bn
application development software market forecast by 2016
Source: Gartner

95%
of mainstream IT organisations will leverage open source solutions within mission-critical software deployments by 2015
Source: Gartner

50%
of all software will be acquired on an open source licence within the next five years
Source: Jaspersoft 2012

44%
of industries most impacted by open source are data management
Source: North Bridge Venture Partners, Black Duck Software and The 451 Group

OVERVIEW

Built by academics and not business people, the internet was open source from the outset. When Sir Tim Berners-Lee decided not to patent his web server and browser, he ensured that the world wide web, which made the internet usable by businesses, would be dominated by open source software.

It was only a matter of time before open source moved out from network infrastructure to applications, enabling computing to become fully independent from the big and powerful hardware and software vendors. Some of the most active areas currently in computing – big data analytics, the cloud, smartphones and tablet devices – rely heavily on the software.

Open source attracted adopters because they did not have to pay to install and use the software. Having free access to the source code, meant that anybody in the active and enthusiastic user communities could develop and make available additional functionality and bug fixes very quickly.

Software companies liked it because, with the licence fee being replaced by ongoing support contracts, they were able to sell associated services. Even vendors, such as IBM and HP, were heavily promoting Linux, the open source operating system, against their own UNIX operating systems.

Governments liked it because, after being locked into a series of costly proprietary software upgrades for enormous numbers of users with little volume discounts being given, it offered them reduced annual IT costs. Software is not needed just by the Civil Service, but by the whole public sector, including local councils and the National Health Service, not to mention large numbers of students at schools and universities.

Technically, adopting open source software was a sensible choice. However, it incurred resistance at the enterprise level from user organisations, possibly unaware that their businesses were already dependent on open source software deep in their infrastructure. They wanted the perceived lower risk of using software from major vendors, with a clear responsibility, known as "one throat to choke", if things went wrong.

> **The speed of development associated with open source has encouraged innovation and increased business agility**

Faced with the threat of losing much of their installed user-base, the traditional proprietary software vendors defended their interests with a series of hard individual negotiations with their largest customers. The result was large-volume, long-term licensing deals that would keep them away from open source for a period.

Whereas the principal software vendors have always had a formal structured ecosystem of partners and resellers, open source has encouraged a much larger informal group of individuals and companies, including both developers and users, to collaborate in facilitating entire integrated, highly reliable and secure systems.

Major web-based companies, such as Amazon, Facebook, Google, Twitter and YouTube, have built their massive and reliable infrastructures on open source. Even high-volume, real-time transaction processors, such as Amadeus, the global airline and travel booking system, are migrating mission-critical systems to open source.

The speed of development associated with open source has encouraged innovation and increased business agility, vital for bringing sustained advantage in an increasingly competitive business environment. With the shift to private and public cloud computing, open source is playing an increasingly important role in the transformation of corporate computing.

Open Source

Enterprises break open the proprietary mould

Open source shatters established policies that favour proprietary software packages. Now support and security concerns have been allayed, enterprises are not only finding cost-saving benefits, but also discovering fresh sources of innovation, as Adrian Bridgwater reports

ENTERPRISE

■ Open source's welcome embrace of interactive community engagement and its inherent diversity was always going to unsettle the traditional business sector's approach to software. In the locked-down world of enterprise IT, proprietary behemoths of both hardware and software dominated for more than half a century, so change was never going to happen overnight.

There is no such thing as a "free lunch" and the concept of offering open source applications with no charge to enterprise is no different. Sun Microsystems, despite being primarily known for its server and storage hardware, was also the lead developer and organiser of the Java operating system community. Prior to its acquisition by Oracle in April 2009, Sun's president and chief executive Jonathan Schwartz used the 2008 JavaOne conference to explain the workings of the open model.

"The software is free but, when you want the support and maintenance, we'll be there to sell that to you," he announced.

The same model is found at Red Hat where the firm is a major contributor to the free Fedora Linux operating system project, but also sells Red Hat Enterprise Linux, a supported release for commercial use.

The question arises, irrespective of flexibility and control factors, can return on investment (ROI) and total cost of ownership (TCO) actually be improved inside the open computing model?

Hidden powerhouse driving forward new markets

Pages 08 & 09

ROI is always hard to gauge if a firm is moving to Linux and other open platform technologies because a certain amount of training and reskilling will typically be involved. While forced upgrades and product end-of-life announcements may become a less-prevalent feature, licensing and regulatory compliance issues are by no means equally reduced.

TCO is probably easier to analyse as long as we accept the difference between "gratis" versus "libre" and recognise that there is a cost associated with so-called free software. Free Software Foundation and GNU Project founder Richard Stallman famously explained that we should think "Free – as in free speech, not as in free beer". By this measure, Linux still incurs support costs and a firm will still need to pay for electricity, internet bandwidth, data storage and back-up charges, plus all traditional business costs from equipment insurance to air conditioning.

Enterprises can improve ROI and TCO if open technologies are embraced for their core functional benefits. If a company has a competent set of in-house software developers or a trusted third party working with open source code, then there is an opportunity to react to change and modify software more quickly.

Access to the code gave rise to claims of a lack of robustness in deployments of Linux and its many variants in heavyweight business environments. In the mid-1990s, these perceptions began to change and, predominantly at the server level, open source started to emerge as a viable, adaptable and secure alternative to proprietary solutions.

"Open source software is proven to be secure and reliable for all business functions, including those which handle sensitive and financial customer data," says Steve George, vice president of products and communications at Canonical. "In fact, many open source organisations specifically target the public sector, such as defence and healthcare, where security is paramount. It's existence is much, much more prevalent than many people realise."

As we now move to cloud computing environments, where the so-called virtualisation of hosted computing resources support the needs of IT, open technologies appear to be leading something of a charge. LetterGen, a Belgian supplier of document management software, migrated its virtualised systems from VMware to the fully open source Red Hat Enterprise Virtualisation platform late last year.

> **Open source can offer huge benefits, enabling faster innovation and reduced total cost of ownership**

Luc Vandergoten, chief executive of LetterGen, explains: "We made the strategic decision to migrate for a variety of reasons but, in particular, we were impressed by Red Hat's subscription model that has no high up-front licence fees and costs the same each year. We expect the virtualisation guest rights, included in the Red Hat Enterprise Linux subscription, alone to lead to reduced IT-related costs by over 60 per cent."

LetterGen used a live migration feature to move to its new infrastructure and it is now able to make efficient use of its virtualisation cluster by moving virtual machines from one host to another without affecting performance. "In addition, the maintenance management functions enable hosts to be upgraded and maintained while the virtual machines are running. The result has been much less downtime and much higher availability," says Mr Vandergoten.

As open source continues its concerted, but comparatively non-aggressive encroachment across the newly cloud-enabled enterprise, what software application areas are we most likely to see open platforms supporting? Continuing Linux's proximity to "lower-level", data-centric functions, open source finds much success when employed to drive elements, such as application servers, software code change management systems and content management systems.

This back-office IT trend is changing though. As open source gets ever closer to users' desktops, as a Windows or Apple OS X alternative, so it also finds success in the business- function space when used as an enterprise resource planning (ERP) tool, a business process management (BPM) layer, and as an executive-facing business intelligence (BI) tool, often running on a cloud platform.

Spawning a healthy proportion of cloud implementations right now is OpenStack, an infrastructure-as-a-service project initiated by cloud-hosting company Rackspace in collaboration with the US space agency NASA two years ago. Subsequently, the cloud technology stack developed by the two companies has been open sourced and handed over to its community of users for further development.

Backed by more than 180 technology vendors, OpenStack has been successful in terms of paving the way for open computing platforms in the cloud arena. Website and web application testing company Soasta used Rackspace's Cloud Servers product on the OpenStack platform to provide customers, including the London 2012 Olympic Committee, with its Cloud-Test service.

This service enables companies to analyse their site and application performance in response to simulated high-traffic bursts. In providing this service, Tom Lounibos, president and chief executive of Soasta, placed his faith in the open cloud.

"What OpenStack does for us is to give us options – and really powerful options – because so many companies are now moving toward OpenStack. We see this as an explosion of capacity and locations, which are very important to us. We think OpenStack is a very powerful player in the cloud community and will be the future of cloud computing as we go forward," he says.

An important caveat is that, even where open source solutions are deployed at the enterprise level, some customers will work in environments where implementation of commercially supported code is mandatory because they are bound by a stipulated level of risk due to the sensitive nature of their work.

Application deployment scenarios, such as those found in aerospace, government or healthcare, for example, will need their software code more firmly locked down than others. Open software is built with inherently dynamic software code that is, by its very nature, changeable and customisable. In environments where compliance and governance concerns demand it, a hardened version of "static code" is available – once again at a price.

> **While transitioning from closed to open systems is no trivial task, unless this step is taken, businesses risk being left behind**

Proof that open source can be implemented successfully in the aerospace sector is found in travel transaction processing company Amadeus. The firm transitioned to open platforms and says that, even in its demanding high-volume transaction processing environment, open systems have proven not just fit-for-purpose, but also critical to helping the business transform how it operates.

"Open source can offer huge benefits, enabling faster innovation and reduced total cost of ownership. While transitioning from closed to open systems is no trivial task, unless this step is taken, businesses risk being left behind as their competitors capitalise on the new possibilities this offers," says Hervé Couturier, executive vice president of development for the Amadeus IT Group.

While we can almost certainly define the current decade as a significant inflexion point for the wide-scale implementation of open source technologies from the cloud to the desktop, what role Microsoft or Apple will play is harder to predict. Microsoft has made its own not inconsiderable forays into open source and has been partnering for the sake of interoperability with open platform players for some years now.

Futurists and open source evangelists alike argue that that the future is open for software, hardware and the platforms that we use to build both our information technology and everything from bicycles to motor cars.

"Today it's common to see open source technology powering all areas of the enterprise right from infrastructure to business-critical applications and the desktop," says Canonical's Mr George. "Because open source is prime for web, intranet, file and server, it means that it's possible for new and large-scale web-based organisations, such as Quora and Instagram, to build and run their entire business on it."

As we stand today, it is 100 years between the invention of the autolathe process to manufacture standard component engineering parts, such as the standard screw, and the subsequent invention and construction of the jet airliner. Common open standards that drive innovation always win in the end.

Open source web system to improve Sheffield City Council efficiency

Sheffield City Council recently announced that it rebuilt its complete web infrastructure within a unified technology platform driven by Magnolia CMS, the open source content management system

The project was implemented by user experience-led enterprise web developer, Technophobia, part of Capita plc. It is part of Sheffield City Council's eServices strategy to deliver more council services online and follows recent recommendations highlighted by an independent review of Directgov led by Martha Lane Fox.

Magnolia CMS will allow Sheffield City Council to improve efficiency and will be a key component of a modular, Java-based service-oriented architecture (SOA), which will dramatically simplify the provision of new online services and future self-service transactions.

The new platform consists of several components, including Magnolia CMS, an enterprise search service, and an analytics service, integrated to form a service-oriented architecture that can be extended with new features.

Initial benefits already delivered include a federated search function, enabling site visitors to access a range of partner websites which deliver services on behalf of the council. The site will have an improved focus on creating accessible plain English content to help users easily find and understand information and services. The new platform will also reduce the time and complexity of providing information online, helping deliver greater efficiencies and value, and enabling the council to increase the range of services that site visitors can carry out via self-serving online.

The council hosts seven websites, including the main council site and six partner sites, which had previously been run using a legacy content management system (CMS). With the decision to adopt a common Java platform for the council's online infrastructure, these websites have also been migrated to a Java system. This means that all sites can now draw on central services, such as search and analytics, a reuse of functions that typifies how SOA can drive efficiencies.

Saul Cozens, consultant, Technophobia, explains how the new platform is already delivering benefits: "As just one key example of this, we were able to integrate enterprise search technology straight into Magnolia CMS to deliver a best-of-breed federated search capability running across all the sites.

"For end-users, this one simple development changes the usability of the council's entire online services. Users no longer need to start out on the correct one of seven websites to find the information they are looking for. The new unified platform ensures that a search on any one of the seven websites will return relevant results from both the council and its partners' sites and available online resources, such as jobs, council tax, waste and recycling.

"The search function is now included in the new common navigation toolbar that we have added across all the sites. For now, the design for each site remains the same, minimising disruption to existing users, but the navigation toolbar is starting to draw together the way these sites behave. This is vital as it means the experience, when using any of the sites, is consistent and easier for users to learn."

Further custom functionality developed by Technophobia for Sheffield City Council has included powerful analytics capabilities built into the editor dashboard. Where analytics data was previously accessible to a few power users, the dashboard lets all content editors see detailed information on their pages, such as page visits, unique users and search keywords.

Magnolia CMS has brought about another significant change behind the scenes for council staff looking to add new pages. The easy-to-use interface allows editors to see exactly how the page appears to site visitors as they create and edit content. The previous CMS did not allow in-page editing, so changes were time-consuming and more difficult to get right first time. In addition to increasing efficiency, the ability to customise the administration system functionality has also allowed the council to add features that improve accessibility and user friendliness.

As the web's importance as a channel by which local authorities can engage with their citizens increases, the use of an open platform gives Sheffield City Council the option to avoid big expensive upgrades and gradually introduce new features cost effectively as they are required.

"As people expect more services to be available online, it is vital that we ensure these services are also accessible to everyone," says Julie Bullen, director of customer services for Sheffield City Council. "This is not just about technology and usability of the website, but also clear communication and social inclusion.

"One of the most exciting developments is how we have customised the interface for content editors. We have created a special dashboard that scores the readability of new content, highlighting problem areas, like excessive use of long words or complex sentences, via a simple traffic-light warning system. By reminding editors of this as they write, it helps us to build best practice into our day-to-day operations and continuously improve our online offer."

> **An open platform enables Sheffield City Council to avoid expensive upgrades and gradually introduce new features cost effectively**

Look beyond the software to the people behind it

Open source software is based on the communities that develop and support it

Before embarking on open source, organisations should carefully consider the strategies and policies required to implement it successfully, writes **Billy MacInnes**

STRATEGY

While the decision to adopt open source software can seem momentous, it is only the beginning of the process. Choosing the right product is the next step but, in the open source world, the criteria an organisation applies to making that choice can differ from buying traditional commercial software.

Using externally developed open source code is a different process than internal development, so companies need to identify internal stakeholders – including IT, quality assurance, and legal and business management – to review and approve what code is used and where, says Peter Vescuso, executive vice president of marketing at Black Duck Software.

Brian Green, managing director of Suse UK, believes businesses also need to consider how the technology fits into their broader IT strategy. In most cases, it needs to sit alongside an existing infrastructure so it is important to understand the impact open source will have on existing IT systems.

The IT department needs to spend time educating teams and assessing their skills to ensure they can implement and manage the chosen software, although Brian Gentile, chief executive at Jaspersoft, suggests that some teams may already possess open source skills from working on non-production or personal projects.

It is also very important to look at the ecosystem behind the product. Open source software is based on communities that develop and support particular products, so companies would be well advised to investigate the community around a product before they decide to deploy it.

Richard Jones, technical director at i-KOS, puts it succinctly: "Open source is an ever-changing, volunteer-powered organism. The majority of open source software contributors are volunteers and the culture of open source is based on free sharing of found and created content.

"Look beyond the software itself to the people who are behind it. How are they behaving? Are they committed? Do they respond quickly to security issues? You want your chosen solution to come with an active, welcoming community and available talent who know the product and want to work on it."

For businesses accustomed to dealing with vendors who sell and support their own products, the open source world can appear slightly disorienting. Fortunately, there are some safeguards, as Paul Wander, vice president at Inviqa, points out. Many products tend to be backed by a heavyweight company, such as Red Hat or Acquia, he says, so if something goes wrong "there is a serious company that will be there to catch you and support you".

Alfresco chief executive John Powell says it is also worth looking at the licence behind the software. An Open Source Initiative (OSI) certified licence gives the user certain rights to modify the software, customise it and redistribute it.

"If you find a problem and report it, the maintainer of that software can help fix it," Mr Powell explains. "If you make a change, you should do your best to get that accepted into the core project so you don't have the cost of perpetual maintenance."

Mr Jones at i-KOS adds: "A good open source citizen will share improvements they make to the software, for their own purposes, with the wider community. This concept can be quite alien to some organisations."

Companies struggling to get to grips with the open source culture may find it easier to use a consultancy or solution provider to help them develop an open source policy and strategy. The broad range of open source software means companies are not tied to specific vendors for services and the wide selection of service providers supporting open source projects means "everyone can find a provider that meets their skill and budget requirements", concludes Jaspersoft's Mr Gentile.

> **A good open source citizen will share improvements they make to the software, for their own purposes, with the wider community**

50%

of IT executives said they use open source in non-mission-critical and mission-critical environments

46%

of organisations have deployed open source applications for specific departments and projects

22%

use open source consistently across all departments

31%

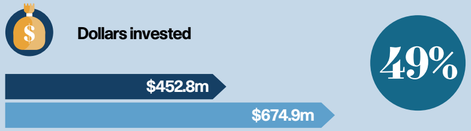
said open source is part of the company's IT strategy

Source: Overview of Preferences and Practices in the Adoption and Usage of Open Source Software, Gartner 2011

Open Source

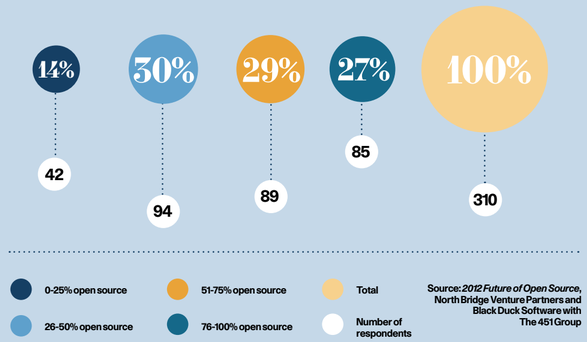
Growth of open source gathers momentum

Open source investment by numbers



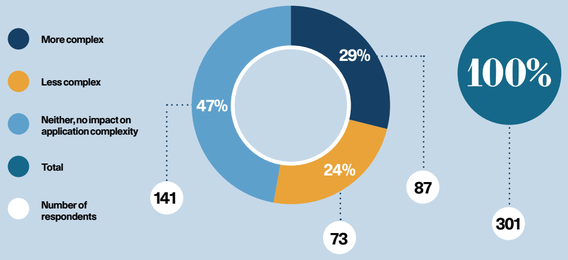
Source: *2012 Future of Open Source*, North Bridge Venture Partners and Black Duck Software with The 451 Group

In five years, what percentage of purchased software will be open source?



Source: *2012 Future of Open Source*, North Bridge Venture Partners and Black Duck Software with The 451 Group

How is the growing use of open source components impacting the manageability of applications?



Source: *2012 Future of Open Source*, North Bridge Venture Partners and Black Duck Software with The 451 Group

Open source adoption in the United States is mirrored in the UK and elsewhere in Europe

$43,460
average annual wage for all occupations in the US, 2010

$89,456
average annual wage for software development occupations in the US, 2010

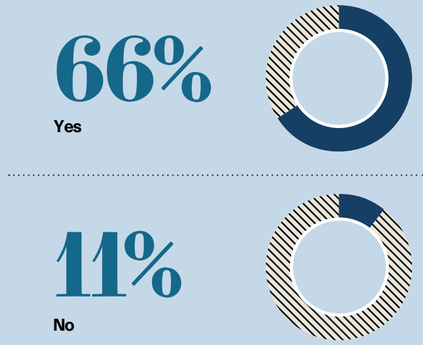
Source: Munich Personal RePEc Archive, April 2012

1.2m
estimated open source-related software development jobs in the US, 2008

1.47m
projected open source-related software development jobs in the US, 2018

Source: Munich Personal RePEc Archive, April 2012

Are you familiar with the term "open source"?



Source: Economic Impact of Open Source on Small Business: A Case Study

Hidden powerhouse drives forward new markets

From the birth of the internet to the creation of the cloud, free software has been the major driving force, as **Billy MacInnes** discovers

SHARING ECONOMY

It is not hard to get a good example of the hidden benefits open source software (OSS) brings to everyday life. Start with something most of us use frequently: the internet.

Around 78 per cent of websites rely on an open source technology known as PHP and nearly 58 per cent of web servers use Apache software which is also OSS. An additional 12 per cent use Nginx, yet another open source project. In total, 70 per cent of the web hosting market is powered by open source.

Three content management systems commonly used for blogs, WordPress, Joomla and Drupal, are OSS and account for 70 per cent of the market.

Dominique Karg, chief hacking officer at AlienVault, offers a personal recollection of the impact OSS made 15 years ago.

"I still remember the huge satisfaction I had by just setting up my own Apache and sharing a couple of sites," she says. "This exhilarating experience drove me, and a huge number of others, to explore and set up our own server systems: web servers with database backends, security programmes and network simulators – for example, Zebra – to play with more advanced stuff."

Red Hat chief executive Jim Whitehurst claims OSS played a large role in the development of Google and Facebook. In an interview with the *Times of India*, he says: "The cost of building even the beginnings of Google, if you were doing that in the traditional IT stack way, would have been prohibitive. Our estimate is that, if they had paid traditional licence fees, even discounted, they would have paid $10 billion (£62 billion) every year in such fees."

Google is a strong supporter and is involved in numerous initiatives, such as Apache, OpenBSD, OpenSSH and Chrome. Facebook also has a very strong open source ethos. It runs the world's largest deployment of Hadoop software, supporting distributed processing of large data sets across computer clusters. Other Hadoop users include Google, Amazon and Microsoft.

Open source is also fuelling a large part of the cloud computing phenomenon. Stephen O'Grady, analyst at RedMonk, is unequivocal. "Open source is, in a very real sense, the reason the cloud exists," he says.

Major cloud providers, such as Amazon, built their platforms on open source software foundations. The lack of licensing restrictions made open source much easier to use with cloud platforms, compared to companies such as Microsoft which had to make Windows licensing fit the cloud model.

> **Open source is, in a very real sense, the reason the cloud exists**

"The result is a cloud environment which is not all open source – Microsoft, VMware and other closed source providers have substantial penetration – but overwhelmingly tilted in open source's favour," adds Mr O'Grady.

Fabio Torlini, vice president of marketing at Rackspace, agrees open source will make significant inroads in cloud computing. "When an organisation has firm plans for many hundreds or thousands of cloud servers, open source can have a significant financial advantage. Equally, when usage is expected to vary significantly, open source solutions can sidestep the commercial complexities of enterprise licences that have not yet adapted to the cloud era."

Government seeks to define basis for software adoption
Pages 14 & 15

The smartphone and tablet markets are big open source users. Apple's iPhone helped popularise the smartphone but, according to figures from analysts IDC, the Android open-source operating system was installed on 68 per cent of phones shipped in the second quarter of 2012.

The natural benefits of open source technology – freedom of choice, no licensing costs, no vendor lock-in, easy to understand licensing terms, the ability to modify source and improve code to address an issue or problem – have helped to grow new markets more rapidly than if they had been left to proprietary vendors. Without open source technology, things would be very different today.

Fresh ideas to enable new technologies

Collaboration is the secret of open source's ongoing success because the pooling of seasoned experts' skills and the free-thinking of newcomers creates exciting possibilities, as Richard Hillesley reports

INNOVATION

■ Open source is driving the next wave of computing – and there are good reasons why this should be so. As data and the network become more complex, interoperability and commonality become greater issues. The transparency of open source and its adherence to open standards are essential in a networked world where every device has to be able to speak to every other device.

The distributed open source model of software development grew out of the developer communities that evolved around the Linux kernel and other free software projects during the early-90s. These communities called upon thousands of volunteers, with a diversity of skills, who came together across organisational and geographic boundaries to write free software, facilitated by the channels of communication that had been opened up by the internet.

Open source encouraged the participation of communities of developers, students, companies, hobbyists, professionals and academics. And the code was better for it. Mitchell Baker, chairwoman at the Mozilla Foundation, points to the developer-driven nature of such projects as one of the reasons why open source is driving innovation.

"Open source technology provides a voice to a vast population of developers enabling them to be heard," she says. "These developers have valuable knowledge that open source technology can tap into. Ultimately, a product that has had a number of different developers working on it will be better, because each developer will provide different ideas and knowledge to the development. Collaboration is more powerful than a single developer working on their own."

The informality of the open source model and its ability to allow participants to find their own level encourages innovation beyond the reach of commercial structures. Anyone can contribute and the measure of their worth is the quality of their contribution. The employee of a company who is paid to contribute to an open source project is seen first as a member of the community and, second, as an employee of the company for which he or she works.

Julian Heerdegen, customer relationship management evangelist at SugarCRM, says: "If you work on an open source project, your work is visible to the community, which results in mechanisms akin to peer review, the methodology used in science to ensure the quality of research. The result is ultimately the same – high quality of code."

Ms Baker adds: "Developers need to have the freedom to explore. Open source technology provides crucial access to product development for a number of developers who wouldn't normally have access. It provides a vehicle for them to experiment and to try the crazy things that nobody else would."

There are no limits on who participates, which inevitably extends the possibilities for unconventional perspectives and unexpected solutions. Many successful projects, including the original Firefox browser, began as the work of one or two developers with a crazy idea that turned out to be the right.

Pooling of resources and collaboration benefits everyone. If a company is giving away software that has brought it advantage, it is also gaining from the donations of its rivals. It is estimated that the pooled value of the research and development incorporated in the Linux kernel is worth more than $10 billion (£6.3 billion). Companies as diverse as IBM, Intel and Qualcomm invest billions in Linux and open source innovation centres, and Google sponsors the "Summer of Code" which offers stipends to students all around the world to work on free software and open source projects.

Open source gives access to expertise and technology that might otherwise be out of reach. For this reason, many smaller start-ups, as Google once was, have based their operations on the use of open software. Google was able to customise its own version of GNU/Linux on clustered servers to build its search and storage algorithms, which required thousands of Linux servers running on commodity hardware.

Paradoxically, the willingness of companies to collaborate encourages innovation in other aspects of the business. A new device can be brought to market much more quickly because the operating system is already there. No single company has had to recoup the vast expense of developing an enterprise-level open source from scratch and precious engineering resources are liberated to develop other aspects of the design.

A corollary of the collaborative approach is that there is a commonality of standards so interoperability issues fall away. As computing has moved towards the web, it has made less sense to deploy conflicting technologies that result in vendor lock-in and there is no point in re-inventing the wheel. Consequently, open source has moved up the stack.

Pooling knowledge and resources on the technology and feeding back software changes to the community has been of mutual advantage to all the players. Sharing the technology has improved performance and reduced overall costs for everybody. Collaboration, even with rivals, works – a fact that has been realised with some effect in the animation, special effects and biotech industries.

A growing number of enterprise software companies, such as SugarCRM, distribute their software under open source licences because "ease of access helps large innovative communities and ecosystems to spring into life", according to Mr Heerdegen. "Open source is to innovation what public infrastructure is to an economy: the more you have, the more growth is driven by individuals making the best use of it," he says.

In recent years, the nature of computing has begun to change. Every computing device is networked to other devices, and free and open source software is coming into its own. The conductors of the new realities of enterprise computing, mobile devices, virtualisation, big data analysis and the cloud, are being driven by open source software.

In the mobile space, Mozilla is working on a truly open source Linux-based mobile operating system to compete with iOS and Android. "Firefox OS is not designed to create a third platform," says Mozilla's Ms Baker. "Instead, Mozilla wants the web to be the third alternative to the closed walls of the Apple and Google stacks. Firefox OS will be an open source platform for mobile, where the governing rules for the ecosystem will be looser, promoting freedom and innovation."

The proven model of free/libre open source software (FLOSS) development and the accessibility of ideas that it promotes has obvious attractions for a wider variety of projects beyond programming and the narrow confines of computer systems software.

Facebook provides an illustration of the possibilities and has released the design specifications for its server hardware under an open licence "because openness always wins". The Facebook developers have redesigned the power supplies and motherboards for its servers, and stripped away the server cases and unnecessary add-ons, to achieve a massive power saving. The designs are now distributed under the auspices of the Open Compute Project as a service to other companies, perhaps in the hope that they will develop further power-saving enhancements.

A more radical possibility is provided by the Riversimple open source, hydrogen-fuelled car, designed by British engineer Hugo Spowers and backed by Sebastian Piech, grandson of Ferdinand Porsche. Riversimple intends to license its designs to an independent body, The 40 Fires Foundation, on the understanding that "engineers and designers from around the world can help develop the vehicles, and any manufacturer around the world can make them".

> **Open source is to innovation what public infrastructure is to an economy: the more you have, the more growth is driven by individuals making the best use of it**

Alamy

Open source encourages co-operation and free-thinking

TECH 01

Raspberry Pi computer

The Raspberry Pi is a revolutionary computer, the size of a credit card, designed to be a cheap, fun computer that can be used as a badly-needed educational tool for teaching programming skills to children. It is marketed by the British-based Raspberry Pi Foundation, a registered charity.

The computer comes in two versions, priced at $25 for a standalone model or $35 for a networked version. It is priced in dollars, the Foundation says, because "currency markets are so volatile at the moment".

When connected to a TV and a keyboard, a Raspberry Pi will do most things a PC does, but the makers hope schools will take up the challenge and use it to teach children the delights of programming. It uses an Arm processor and a solid-state Secure Digital (SD) card for booting up the operating system, and for general storage of data.

The recommended operating system is Raspbian, an optimised version of Debian GNU/Linux, and includes the Lightweight X11 Desktop Environment (LXDE) desktop development tools, and "example source code for multimedia functions".

A user guide is being written by Computing at School to help teachers and pupils to get the best out of the Raspberry Pi.

TECH 02

Open data analytics

The role of big data analytics is to crunch and rationalise huge volumes of data across clustered file systems to find patterns which might uncover hidden relationships in the data or give a business advantage to an organisation. The field is still maturing, but it is being increasingly dominated by open source projects, such as Hadoop, NoSQL, and the R statistical computing language and graphics environment.

Hadoop, the driver of much of the current technology around big data analytics, is an open source implementation of Google's MapReduce and File System (GFS) technologies. Companies that use Hadoop typically have millions of visitors every day, each of whom demands a unique set of instantaneous responses.

According to analysts Forrester Research, the reasons why these solutions are gaining acceptance in the field of analytics are because "open source initiatives are transforming all platforms and tools... open source communities are where the fresh action is... and open source solutions and providers are maturing rapidly".

Hadoop, NoSQL and R are common ingredients in diverse software suites from different vendors. Each supplier depends on the support it provides for revenue, making commercial open source software projects more responsive to customer demands – because they have to be.

TECH 03

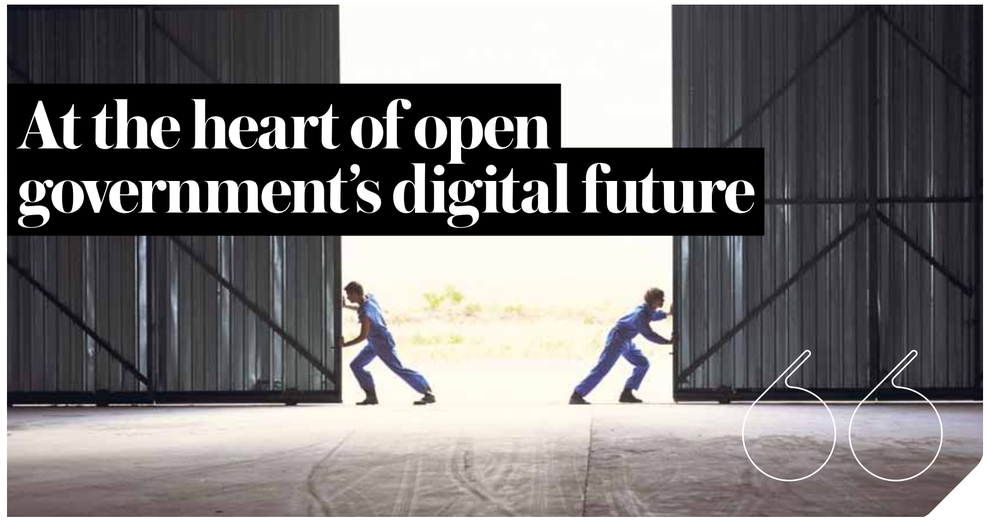
OpenStack cloud

At the forefront of cloud development is the OpenStack project which now describes itself as "a global collaboration of developers and cloud computing technologists producing the ubiquitous open source cloud computing platform for public and private clouds".

On the internet, information is exchanged in many different computer languages, so it is important there are common reference points to facilitate interaction. In the cloud, interaction standards are still loosely defined, awaiting a report from the Cloud Standards Customer Council (CSCC) addressing open interoperability standards from the end-user viewpoint.

According to Angel Luis Diaz, IBM vice president for software standards and the cloud: "What is unique about OpenStack is that it is a perfect example of user-driven architecture. It has a huge end-user community which has accelerated the development and the usability and interoperability of the software. When it started in 2010, there were a handful of developers. Now there are 6,000 individual contributors from 200 companies and 40 user groups across the globe. The software has been downloaded 300,000 times."

The turning point in OpenStack's fortunes was the decision to form an independent foundation to put space between the community and the ownership of the code by Rackspace and NASA.



At the heart of open government's digital future

Liam Maxwell, deputy government chief information officer and Cabinet Office executive director of IT Reform, says the future is based on open standards and open source

POLITICS

There are still those who consider open source to be a marginal option, less secure than proprietary software and not as good as the big, branded software packages – but their day has long gone.

Open source software is a core component across enterprises and government. Indeed, it feels strange to think it was once viewed as unorthodox. Companies now routinely mix both proprietary and open source software as a means of lowering the cost of IT and stimulating innovation.

Until recently, government was behind that particular curve, yet open source played a crucial role in understanding why government IT projects were so big, complex and expensive. The treatment of open source by government IT departments in the first decade of this century identified many areas of misunderstanding in strategy, architecture, delivery and procurement. It also showed a way to radically lower the cost base for government IT. And this needed to come down – in 2009, industry experts such as Kable [market intelligence] showed that, across the public sector, IT costs were approximately 1 per cent of GDP.

The Coalition Agreement in 2010 was the first programme for government to carry a detailed technical objective: "We will create a level playing field for open source software and will enable large ICT projects to be split into smaller components."

Too often, government contracts adopted a default position of using a small number of large IT suppliers – the "oligopoly" – on long-term contracts.

The result was a lack of competition for our contracts, poor value for money and high levels of vendor lock-in. That lock-in often included uncompetitive software deals – deals we have recently renegotiated to release tens of millions of pounds in savings.

We firmly believe that establishing a level playing field for open source and proprietary software changes that dynamic and unlocks efficiencies. It creates a much needed competitive tension in our procurements and opens up innovation.

It also enables government to be an intelligent customer, so that we can break up uncompetitive contracts, place ourselves in control of our IT architecture and reduce the cost of government IT.

We have shown this year that disaggregating black-box system integrator contracts into smaller multi-supplier contracts saves us up to 30 per cent. To date, for 2012/13, we are booking £400 million in savings from our spend controls process as we drive through that change.

Now, all government departments use open source to some degree and intend to build on that base. The Department of Energy and Climate Change (DECC) and the Department for Business, Innovation and Skills (BIS) stand out as leaders and in some large operational departments there is now a strong presence – for example, 30 per cent of Revenue and Customs (HMRC) IT is open source.

We have undertaken a programme of myth-busting to address unfounded concerns around the security of open source software and taken steps to address any requirements specifications that unfairly preclude open source – or proprietary – software. We have also published our open source tool kit to provide guidance to the procurement and IT communities so we can address capability issues in departments.

> **We firmly believe that establishing a level playing field for open source and proprietary software changes that dynamic and unlocks efficiencies**

But use of open source is about more than back-office efficiency – it is also at the heart of our commitment to deliver public services designed around the needs of citizens: digital services that deliver better services for less money.

The future of government is not about IT – actually we have to fall out of love with IT. It is about digital public services. The first stages of constructing this digital government were completed earlier this month with the launch of GOV.UK.

As my colleague Mike Bracken, who leads the Government Digital Service (GDS), explained at the launch of the beta version of GOV.UK in February, this open government platform is "inherently flexible, best of breed and completely modular".

For the inquisitive, GDS has published its technology stack here: http://radar.oreilly.com/2012/01/with-govuk-british-government.html

This is the future of government – and it is based on open standards and open source.

Liam Maxwell combines his role as deputy government chief information officer (CIO) with that of director of ICT futures at the Cabinet Office where he is responsible for devising new ways for the public sector to use technology to increase efficiency and reduce cost; he has also worked as head of computing at Eton College

'Don't risk being left behind'

Adoption of open source software has been the key to success for many of today's top-performing companies. For those without a transitioning strategy, it is time to adopt or die, warns **Professor Jim Norton**

Professor Jim Norton is a respected adviser to governments, an independent director, and has served on several notable inquiries and commissions; he is a past president of the BCS – The Chartered Institute for IT, former chief executive of the UK Radiocommunications Agency and ex-chairman of Deutsche Telekom Ltd

OPINION

The shift to open source software (OSS) is one of the most important current trends in technology, yet it is surprisingly little discussed when compared with the major e-businesses built on its foundations, including Google, Amazon, YouTube, Facebook and Twitter.

Open source can offer huge benefits. While transitioning from closed to open systems is no trivial task, organisations that fail to embrace it risk being left behind as their competitors capitalise on the new possibilities offered.

There are wider benefits to the economy as a whole, adopting open source will help to ensure that businesses are fit for purpose, can compete globally and are best able to evolve to meet the changing requirements of their customers and marketplaces.

OSS did not spring into life fully formed; it has had a long gestation period. Its antecedents stretch back some 40 years to the concepts of open system interconnection (OSI) and the development by Bell Laboratories of the portable UNIX operating system.

UNIX was the inspiration for the first Linux kernel released in 1991 and the following 22 years have seen intensive development of that operating system. Along the way, a number of well-known proprietary operating systems, such as those from Apple and BlackBerry, built on OSS foundations, while others, such as Google's Android, remain largely open.

The advantages of open source, both to the IT provider and the enterprise customer, are manifold. Perhaps one its most important attributes is the access to greater innovation that OSS affords. The combination of open source software, open systems interoperability and open standards has created a self-reinforcing community of shared research and development, and a pooling of creative ideas. In the words of Jim Whitehurst, chief executive of Linux provider Red Hat: "More innovation will happen first in open source and that's a radical change from even five years ago."

> **Adopting open source will help to ensure that businesses are fit for purpose, can compete globally and are best able to evolve**

It is not just about innovation. When faced with an ever-faster pace of change, OSS provides an important competitive weapon by encouraging a quicker response to changing requirements. The speed of change in many markets, especially those with a consumer focus, is now relentless. The availability of a wide range of cost-effective development tools, the ability to scale rapidly and access to a global community of shared knowledge, all favour the use of the open approach. Having an IT infrastructure that is able to support the required commercial agility is a key to success.

Under the continuing impetus of Moore's Law of increasing technological change, developments continue apace. In hardware, this has included the introduction of ultra-high resolution displays, enhanced wireless networking and network-based storage, while in software and systems the field of business analytics has grown. By embracing OSS, companies can benefit from the rapid exploitation of new technological developments in a way that is not possible with closed proprietary systems that require on-going maintenance and reconfiguration.

One of the most important, yet often overlooked, advantages is better access to skilled, motivated and innovative people. A generation has now grown up with the internet and with open source. They want to work with these systems and tools rather than the closed and proprietary approaches that are frequently seen as being more limiting. If companies want to attract the best talent, they must embrace open source software.

This "people advantage" also extends to the existence of a global OSS community, allowing companies to draw on millions of software architects, analysts, designers and programmers to share knowledge and resolve problems. In turn, this opens up endless possibilities for greater collaboration and innovation.

There is also the added benefit of lower total cost of ownership. While OSS is generally free to acquire, rather than being subject to the licensing fees normally charged for access to proprietary software, this is not the correct basis on which to compare costs. It is more appropriate to consider the total cost of ownership over the lifetime of use of the software. Last year, the London School of Economics published a report on the total cost of ownership for the UK Government's Cabinet Office. This report found that: "The highest score for strategic drivers was for reduced vendor lock-in. A close second was value for money."

Open source has demonstrated its capabilities and is now considered fit for purpose even in business-critical applications. Amadeus IT Group, which processes around a billion travel-related transactions per year and the fast-moving trading systems of the London Stock Exchange exemplify its use in highly demanding transaction processing environments.

Open source allows consumers access in real time to a depth and range of services that would simply be unaffordable using the old models. The importance of this for the broader UK economy, too, should not be ignored.

Based on the *Open for Business* white paper, sponsored by Amadeus IT Group.

‘Maybe there is such a thing as a free lunch – and dessert is included’

Having worked in business intelligence and data analytics for many years, I saw an opportunity to acquire Voodoo IS, a company delivering value to clients with an open source strategy, says Scott Cunliffe, managing director, Voodoo Information Systems

Scott Cunliffe, managing director, Voodoo Information Systems

So, why should you consider open source?

Let me start with an analogy; imagine for a moment that the IT market is a café, you fancy a bite to eat and you choose a sandwich. Before taking a bite you sign a legally binding agreement not to open the sandwich and explore its contents. Distaste for cucumber or tomato could well result in some unpleasantness.

The benefit of source code being open to the market is obvious. Open source software allows a community of people to improve reliability and add functionality resulting in rapid evolution, scalability and integration with other applications.

These benefits mirror central government’s current ICT strategy, which advocates the use of open source tools.

Cost is not the only benefit. It is free software; however it would be an oversight to justify an open source implementation on cost alone.

Technologies that Voodoo work with, such as Pentaho and Talend, have development communities numbered in the thousands that dwarf any business intelligence development department of IBM or Microsoft.

Risk mitigation steers chief information officers towards the assumed “safe” options, not necessarily the best options. There have been many examples of projects with big software vendors resulting in seven-figure disasters, unused software and vendor lock-in.

Voodoo have successfully minimised customer risk by supporting many open source management information projects.

Learn more at
www.voodoo-is.com
Contact sales@voodoo-is.com

VOODOO IS

Government seeks to define basis for software adoption

A government committee is preparing to reveal its definition of open standards to level the playing field for implementing open source software alongside proprietary applications, writes Mark Ballard

GOVERNMENT

The Coalition Government laid out plans to re-evaluate, renegotiate and open up its information technology relationships with vendors shortly after it was elected. This massive cost-cutting effort was applied with gusto, but then it stalled.

Now, two-and-a-half years on, what happens next will depend on the results of a public consultation. The government’s dilemma is how to implement the policy. The question for the consultation is what “open” in open standards and open source really means.

The premise was that the IT market had become stagnant. Projects were expensive because government was using so few companies to run them and to supply the technology to be implemented. This lack of competition, the government contended, had inflated prices and public IT projects were disastrous because the technology options had become stagnant. This lack of competition had stifled innovation.

The government proposed a two-part solution in its Coalition Agreement in 2010. It would inject a breath of fresh air through government datacentres by backing open source technologies wherever they offered cheaper implementation and innovation. It also planned to shake up the market by breaking down big IT projects into smaller components, which could be handled by a larger number of suppliers, and not just the major proprietary vendors of the past.

Liam Maxwell, deputy government chief information officer at the Cabinet Office, insists the government is still committed to this policy.

“We spend a large amount of money on IT in government because we have for years spent our money with the same old crew – which my minister refers to as the ‘oligopoly’ – under large, long-term contracts,” he says.

Setting his ideas out in a 2010 report for *The Network for the Post-Bureaucratic Age*, a Cameron administration think-tank, Mr Maxwell says government IT had become so expensive that its total expenditure was more than the entire public budget for Wales or more than the Ministry of Justice and Income Support budgets combined.

“Have we got value from IT?” asks Mr Maxwell. “We don’t think we have.

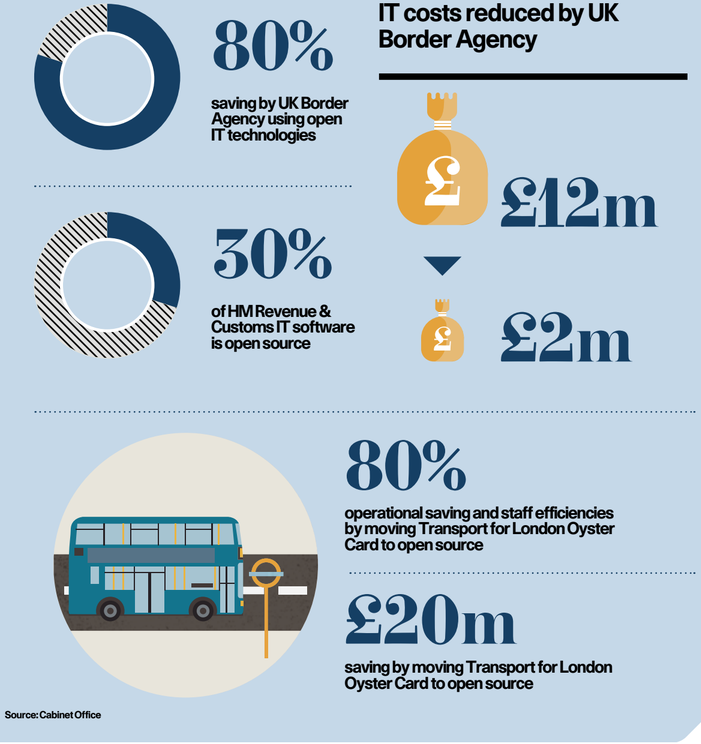
“When we break up the big, black box contracts – disaggregate them into their component parts – we are looking at savings of 20 to 30 per cent,” he says.

Mr Maxwell believes the government has made progress. The Cabinet Office has saved £400 million this year by disaggregating contracts that have come up for renewal. It has also been deploying open source software where it can. The Government Digital Service also launched an early version of a website called GOV.UK which was built using open source software.

“The future of government is open source,” he says. “GOV.UK is all open source. It’s the publishing platform for the future of government.”

Yet the centrepiece of government policy – the piece that brings it all together – has still to be settled; namely, its policy on open standards.

> **The future of government is open source**



Share and discuss online at theraconteur.co.uk

Both coalition proposals – to promote alternative technology and to break projects into smaller parts – begged for a way to glue the parts together. There would be little point in breaking projects up if it only made them so disparate it created a different problem.

In the first place, the original difficulties that gave rise to the limited IT ecosystem derived from technology’s inherent need for its parts to work together as a coherent system. This was achieved by using specific standards of communication so one part of the system could co-operate with another, sharing applications, functions and data.

The problem was that the market had coagulated into competing islands of technology based on proprietary standards. Dominant vendors used their standards tool kit to lock competitors out, stagnating the market and making open source harder to integrate.

The coalition proposed it would place government functions and data in the broadest possible ecosystem to ensure no single supplier or technology was so powerful that it could not be swapped with any other. In this way, contracts could be disaggregated and dominant suppliers replaced without causing problems for existing systems, paving the way for open source software to be deployed because it would not be hamstrung by proprietary standards and protocols.

The government would do this by employing open standards – protocols and connections that could be used by any market participant and implemented in any technology without constraint.

Following discussions with leading vendors and stakeholders in the IT market, including the British Standards Institution and International Standards Organisation, the coalition decided to form the Open Standards: Open Opportunities Flexibility and Efficiency in Government IT committee to define what an open standard might be in context with its plans for open source implementation.

A key consideration is whether open standards should include those for which a royalty fee is charged. This would include consideration of software that contains some proprietary code, but is otherwise open. Examples of these would be fair, reasonable and non-discriminatory (FRAND) standards which are usually core elements of an application. These are essential, particularly for initiating communications protocols and because of this are charged for at non-premium prices.

This is a contentious area because purist open source advocates specify that no licensable material should be used in the software.

The UK policy was designed to create a level playing field for all companies, large and small, with interests in supplying services and products to the government IT strategy, especially the move to a cloud environment (G-Cloud). Unfortunately, it was swept up in the international tussle between the interests of powerful proprietary technology companies and their open source competitors. The result will determine the blueprint for the future, based on the conclusions reached by the government’s Open Standards: Open Opportunities inquiry which is due to report its findings.

How much it will save also depends on this outcome. Estimates range from £600 million to billions of pounds but, whatever the sum, the true victory would be a freeing up of the stagnated government IT ecosystem to allow new blood in.

It remains to be seen if this island will be home to truly open standards which will pave the way to a harmonious blend of open source and proprietary software.

> **No single supplier or technology should be so powerful that it could not be swapped with any other**