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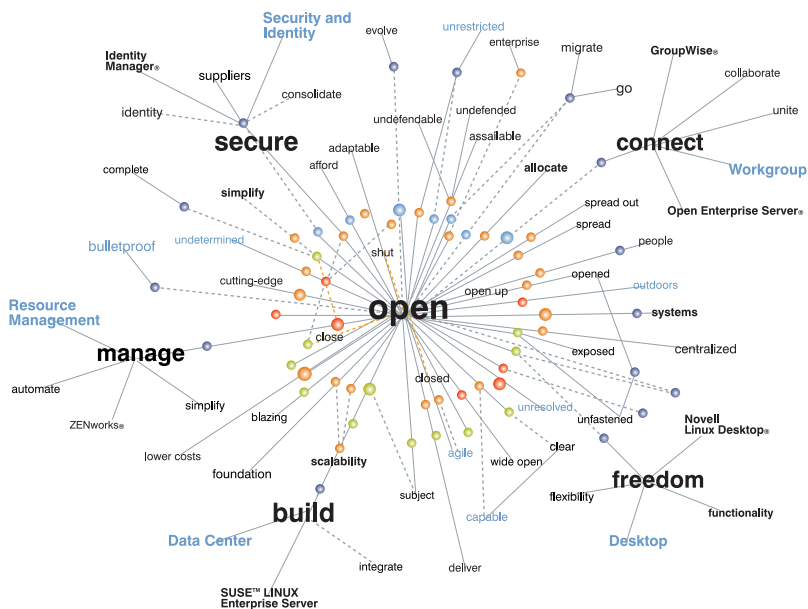
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TABLE OF CONTENTS

PREMIERE 2005 VOLUME 1 ISSUE 1

BUSINESS

6 The Membership Model
An important part of the vitality of the Open Source movement

8 The Business of Open Source
The advertising model

10 The Conversion Model
Enterprise maintenance and support

PRODUCT REVIEW

12 OpenGear's CM4008
Console Access at a great price!

SCRIPTING

14 PHP 5
Open source scripting for the heterogeneous enterprise

VIEWPOINT

20 Strengthening Open Source's Weakest Link
Broader, more collaborative open testing can yield more meaningful results

COMPLIANCE

22 Open Source and the 'Mixed-IP' Environment
Understanding the IP ownership issues behind your software assets

INTERVIEW

26 The Open source Business Conference
Bringing together the business and open source communities

28 Should Open Source Applications Run On Windows?
The great debate

INDUSTRY

30 Dealing with Open Source Licensing
There are ways to find out what's in your code

TELEPHONY

32 Open Source Telephony Answers the Call
Innovation is key

34 Open Source IP Communication
Setting a cat among the canaries

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The Membership Model

An important part of the vitality of the Open Source movement

by Paul Sterne and Nicholas Herring

At LinuxWorld Expo in San Francisco, it occurred to me that I had overlooked a very important Open Source business model, the Membership Model. Confronted by a keynote speech by Stuart Cohen, the leader of the Open Source Development Lab (OSDL) (www.osdl.org), it became clear that I had jumped into the Advertising and Conversion Models too quickly and had to back up and deal with the membership phenomenon.

As a businessman, the Advertising and Conversion Models are more interesting, but from a raw power standpoint the Membership Model may be more important. So in the spirit of journalistic integrity, I have adjusted the Open Source Business Models graphic to correct this erratum.



Open Source Business Models

- Donation
- Membership
- Advertising
- Conversion
 - Brand Ownership
 - Media Kit
 - Maintenance
 - Support
 - Add-ons (Dual License)
- Professional Services
 - Support
 - Integration

Open Source Development Lab

Clearly, the most important, or at least the most respectable, membership organization is the Open Source Development Lab. It boasts three of the top maintainers as employees: Linus Torvalds (he who needs no introduction), Andrew Morton (Kernel 2.6), and Andrew Tridgell (Samba). It can afford 48 full-time staff and contractors. It has offices in downtown Portland, Beijing, Tokyo, and Luxembourg. In venture capitalist parlance, it has a hefty “burn rate” of at least \$750,000 per month or \$15,000 per head – maybe more considering the celebrity staff.

OSDL describes itself as a “big tent [note the political metaphor for basically a political organization] for vendors and customers, where members are not in competition with each other, but instead there exists ‘co-opetition’ between players to solve shared problems” – read Microsoft. The idea is that shared costs lead to shared benefits. At the tactical level, OSDL is a lab or resource pool that provides equipment and infrastructure to large-scale Linux technology projects to support enterprise and telecom applications.

OSDL has more levels of membership than the Catholic Church.

OSDL	Catholic Church
Individual	{ Laity
Academic	
Observing	
Bronze Priest	
Silver	Bishop
Gold	Cardinal
Platinum	Pope

Laity

Individuals join for free but have no voting rights. Academics can join for \$1,000 per year, but can only vote in subcommittees. Observing members can join one “working group” for \$6,000, but can’t vote.

Priesthood

Finally, with \$12,000 in cash you can join one working group as a Bronze member and you get to vote. The Silver, Gold, and Platinum levels are earmarked for larger companies – defined as those with revenue in excess of \$1 billion per year – which is a pretty small group in the software industry, no more than 25 companies. At the Gold level, you get to nominate a member of the Board of Directors. At Platinum, you get to nominate five (5) members of the 12 member board – which begs the question: Do they have any platinum members? Membership fees for the Gold and Platinum levels are not disclosed on the OSDL Web site, so they are clearly out of the reach of us humble folk.

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OSDL quantifies its value based on the total annual Linux-related revenues of its member companies. This figure totaled \$9 billion in 2004 – one-third of which were clearly IBM and HPQ. OSDL also measures its importance in terms of the 1,890 Linux and 62 kernel engineers employed by OSDL member companies. Members include AMD, Cisco, Fujitsu, Hitachi, HP, IBM, Intel, NEC, Nokia, Novell, and Red Hat as well as 70 small and medium-sized businesses.

As Stuart Cohen stated in his keynote speech, the Open Source movement has beaten back the attack of SCO by the joint effort of its member organizations and now faces a new intellectual property threat, namely the “software patent,” from the industry giant (he that shall not be named). In short, OSDL is the chamber of commerce of the Open Source community.

ObjectWeb

ObjectWeb is truly a Gallic institution with all the peculiarities of that wonderful nation of 200 different cheeses and the Ecole Polytechnique. It's not a transparent American chamber of commerce like OSDL but a model of incisive planning and government funding. ObjectWeb (www.objectweb.org) is basically funded and controlled by INRIA. INRIA translates from the French into National Institute for Research in Computer Science and Control. This institute has six locations throughout France and is dedicated to fundamental and applied research in information and communication science and technology. It is comparable to a national lab in the U.S., though without the emphasis on nuclear weapons development.

Francois Letellier, an engaging man who was nice enough to meet with me at LinuxWorld, is the leader of the organization. The ObjectWeb Consortium was established in 2002 “to build a full set of Open Source middleware technologies for industrial-strength distributed platforms.” Its main technical goal is to define and implement a component-based, efficient, and scalable middleware architecture that can be easily configured and adapted to different application domains. Jonas is the most famous Open Source project to come out of ObjectWeb. Jonas is an application server that competes with BEA, WebSphere, and JBoss. Red Hat ships it with its application server and SuSE Linux includes it in the SuSE Linux Enterprise Edition.

To characterize ObjectWeb as a Jonas shop would be unfair though. It hosts more than 100 Open Source projects that range from J2EE architectural design to J containers. It views IBM's recent acquisition of Gluecode, one of the main sponsors of a competing composite application

framework called Geronimo (hosted by Apache Software Foundation), as a threat to its basic mission.

ObjectWeb is a bit more open than OSDL. Membership is free. Corporate members join for only 1,000. As of March 10, 2005, it had 48 corporate or non-profit members and 1,458 individual members. Its mailing lists are sent to 7,926 persons worldwide of which 157 are in China. It has a development portal called the “Forge” used by 5,712 registered users for 109 projects. Each month its Web sites are visited by about 150,000 unique IP addresses.

Eclipse

To many people, Eclipse is an IBM front. It bills itself as an open platform for tool integration built by an open community of tool providers. Eclipse (www.eclipse.org) competes with NetBeans from Sun. In the battle of the downloads, Sun boasts 4.6 million downloads for NetBeans while Eclipse pegs its downloads at 50 million. We'll have to dig a little deeper into these numbers to understand what, if anything, they mean.

Eclipse has a clever fee structure, and charges more than OSDL and ObjectWeb. To become a Strategic Developer, organizations must have at least eight (8) developers assigned full-time to developing Eclipse technology and pay annual fees of 0.12% of revenue with a \$250,000 ceiling. Actuate, BEA, Borland, CA, IBM, Intel, Iona, Nokia, Scapa Technologies, Sybase Inc., and Wind River count themselves as Strategic Developers. Strategic Consumers must pay 0.2% of revenues with a \$500,000 ceiling, but can decrease their fees by providing one or two developers, reducing their fees by \$125K for each developer with a floor of \$50K. If anyone can explain to us the difference between these two designations, please send me an email. Members called committers must be nominated by another committer, and have “write access” to all the content of Eclipse, and don't pay annual fees. Over 90% of the committers are full-time paid employees of member companies. Strategic Consumers include MontaVista Software, HP, SAP AG, and Serena Software.

Another interesting category of member is the Add-in Providers. To earn this designation, a company must have an Eclipse-based offering or commit to making such an offering available within 12 months of joining. And Add-in Providers are required to publicly announce their support for Eclipse. The annual membership fee for Add-in Providers is \$5,000. Add-in Providers include Accelerated

Technology, Acucorp, Agitar, Aldon, Aonix, AvantSoft, Catalyst Systems Corporation, CollabNet, Compuware, DataMirror, DDC-I, Discovery Machine, Embarcadero Technologies, ENEA, Ericsson, ETRI, Exadel, Fujitsu, Genitech, Genuitec, Hitachi, ILOG, INNOO-PRACT, Inpriva, Instantiations, International Technology Group, iWay Software, JasperSoft, JBoss, Kinzan, Klocwork, Logic Library, Lombardi Software, M1 Global, M7 Corporation, Macromedia, Mercury, META-1, Micro Focus, MKS, mValent, NEC, Novell, NTT Comware, OC Systems, Omondo, Optena Corporation, Oracle, PalmSource, Parasoft Corporation, Pegasystems, Progress Software, QNX Software Systems, Real-Time Innovations, Red Hat, SAS, Secure Software, SlickEdit, Soft Landing Systems, Teamstudio, Technologic Arts, Telogic, Tensilica, Texas Instruments, THALES, TimeSys, Unisys, VA Software, Versata, Wasabi Systems, and webMethods.


Finally, Eclipse has Associate Members. Associate Members must be a standards organization, research institution, academic institution, open source organization, or publishing organization that participates in the development of the Eclipse ecosystem. There are no membership dues required for Associate Members, that include ACM Queue, Addison Wesley, BZ Media, CMA (Communications and Media Arts), Fawcette Technical Publications Inc., Eclipse Plugin Central, Fraunhofer Institute for Open Communication Systems (FOKUS), Object Management Group, Inc., ObjectWeb, OpenSystems Publishing, RTC Group, SocialPhysics, and Tsinghua University.

Eclipse boasts an impressive board including Bechtauf (SAP AG), Ed Cobb (BEA), Sam Greenblatt (CA), Jonathan Khazam (Intel), Michael J. Rank (HP), and yet another Dave Thomson from IBM.

Though the Eclipse business model is indeed clever, we wonder if they have properly named their members.

Summary

The Membership Model is an important part of the vitality of the Open Source movement. The leading membership organizations are well funded and organized and provide important technical advances. But they owe their existence to political, not economic, factors. When these political forces recede, so will the importance of the membership organizations.

Next month, we will look at the Conversion Model again and discuss how companies such as MySQL, Jboss, and Open-Xchange are doing. 

The Business of Open Source

The advertising model

By Paul Sterne

In the beginning, the 800-pound gorilla of the online industry was Prodigy, Inc. This joint venture between IBM and Sears Roebuck boasted 2.5 million subscribers in 1993, the year before Netscape broke open the Internet.

From the very beginning Prodigy was out-marketed by AOL. AOL boasted a number of important unique selling propositions (USPs) like personalized user IDs, chat, and a slicker graphical user interface. But most importantly, AOL put itself forward as the force of online purity, the opponent of crass commercialization, and promised to protect users from the aggravation of advertising.

Prodigy tried innovation after innovation to regain its coolness. It was the first to add a browser that could surf the emerging Web. It directed its users to a weird new search engine called Yahoo!. It introduced online role-playing and parlor games. But it could never shake the taint of commercialism because it sold advertising.

It's ironic how the tables have turned. Prodigy no longer exists. AOL has been investigated for barter advertising deals. Yahoo! is now the poster child of online commercialism. And Google, the "do no harm" company, is worth billions selling its search engine combined with crass annoying Adwords.

The most successful Open Source proponent of the advertising model is VA Software Corporation. VA Software owns the Open Source Trade Group (OSTG), an online mall of new media properties with SourceForge as its anchor tenant.

SourceForge is an amazing phenomenon. It's a collaborative development platform that hosts more than 100,000 Open Source projects for free in return for selling ads. In its latest fiscal quarter, SourceForge boasted that it had one million registered users. That's a lot of people interested in free software. During the same quarter, OSTG reported that it had 19 million unique visitors a month and served 290 million page impressions – that's 3.48 billion page impressions a year. Frankly, I find it surprising that 19 million people are interested in things Open Source. But it indicates that the Open Source movement is much

larger than the 400,000 contributing developers often quoted in the popular press.

For the privilege of serving 3.5 billion pages, VA booked new media revenues of only about \$8 million in the last 12 months – which translates into a CPM or Cost per Thousand Impressions of \$2.36. So the Open Source advertising model is unlikely to create the next Yahoo! or its trailing 12 months revenue of \$4 billion but it's a way of making an honest living.

Another major player in Open Source media is O'Reilly Media.

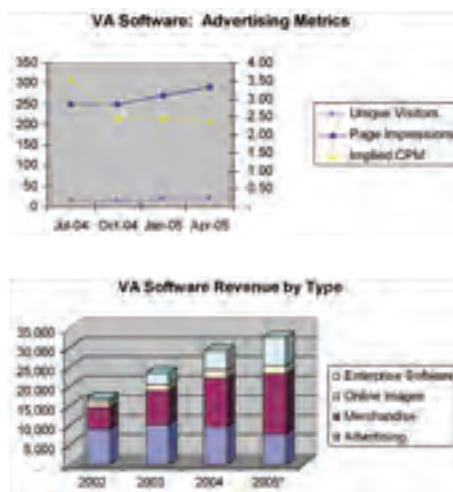
In the past month, Nick Herring, my research assistant, and I contacted some of the major Open Source projects to get a sense of how their Web site traffic compared with VA and O'Reilly. Only the Apache Software Foundation was kind enough to respond and in fact gave us the login for their Web server analyzer.

Apache's Web site serves 26 million page impressions a month to 2.3 million hosts. Based on a CPM of \$2.30, and an annual page impression count of 312 million, Apache could be earning \$736,320 in advertising revenue a year compared to donations it got in 2003 of \$2,875. Think of the good Apache could do with \$736,320. They could morph into the John D. and Catherine T. MacArthur Foundation of the Web and give out grants to starving but talented programmers – a rather large demographic of people who don't want to work for "the man".

So my suggestion to Apache and the other Open Source sites is, swallow your pride and stop fretting about purity and start selling ads to the big corporations that are making money off the Open Source movement anyway – companies such as HP, IBM, Oracle, and Dell.

One last comment about VA and the advertising model. As the chart below shows, VA hasn't been able to grow its advertising business even though use of its Web sites, as shown in the above chart, has increased quarter on quarter because the Security and Exchange Commission has outlawed barter deals. This has caused its CPM to decline.

To offset this decline, the company has expanded its merchandise business – selling nerdy stuff through its online shops – and enterprise software.



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The Conversion Model

Enterprise maintenance and support

By Paul Sterne and Nicholas Herring

The other day my 16-year-old daughter came down the stairs in tears. She was holding the new version of the Scholastic Attitude Test and complaining that it was unfair.

Look at this question, Dad. Who could answer a question like this?"

I looked at the question and had to agree that it was a tough one:

27. Lamb: wolf;
Open Source Project: _____?
a. Microsoft
b. Enterprise software vendor
c. 419 scammer*
d. Jack Messman

(For additional information on 419 scammers, refer to http://www.419eater.com/html/trophy_room.htm.)

"Honey, it has to be A. Everyone knows that Microsoft is the opposite of open source."

"But it's not," she answered through moist blue eyes, "It says I got the answer wrong."

For those of you who have been following our journey through the various open source business models, you can probably guess the right answer. For those who are joining us mid-stream, it makes sense to back up a little and set the stage.

Background

The power of the open source movement is based on the Internet. With the Internet, communication costs dropped to near zero. This economic phenomenon enabled developers from all over the world to collaborate on projects for "free." In an earlier article, we called attention to the Debian world map as a "proof point" of the global reach this "free" resource has made possible (<http://www.debian.org/devel/developers.loc>).

The original open source organizations were based on informal groups of volunteers who got the money to fund their project through Donations. Two very successful open source

projects that are based on Donations are the Apache Software Foundation and Debian. However, there is a natural limit to the amount of resources the Donation model can bring to an open source project, probably about \$5 million per year.

As the open source movement grew and attracted the attention of large powerful corporations like IBM and Intel, a second open source model emerged based on Membership. Open Source Development Labs, ObjectWeb, and Eclipse are examples of successful organizations based on the Membership model. But the Membership model also has its natural limits, probably at about \$15 million per year in funding.

Realizing that the open source movement was very popular, some entrepreneurs decided to create media sites that sold Advertising and sponsorships. Believe it or not, Red Hat in 1999 told Wall Street that a big part of their business model would be selling banner ads to open source geeks visiting their Web site to download "free" software. But the advertising model ran into its natural limits. Banner ads are too cheap. You can't hit a home run like Google selling banner ads. Today, the most successful proponent of the Advertising model is VA Software, which runs SourceForge.net, the world's largest open source development site and OSTG (Open Source Technology Group), the world's leading community-driven media network that services 19 million unique visitors per month. However, VA Software's media-related revenue has plateaued at about \$20 million per year (the equivalent of 13 McDonald's outlets, not very impressive for Wall Street).

The smart money led by Red Hat transitioned to the Conversion model. In the Conversion model, you give something away for free and then convert the consumer of the freebie to a paying customer – somehow.

The first feeble attempt at the Conversion model was the Media Kit. This business model entailed "giving away" the software but charging for the box, CDs, and documentation.



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SuSE Linux is the market leader in the media kit market. It loads lots of stuff into its Linux distribution (i.e., SuSE Linux Professional supposedly includes 3,500 packages) thus making it too large to download, so that it can sell 250,000 media kits per year for \$89 each. The problem with the media kit model is that it also appears to have a natural limit in the annual sales range of \$25 million (the equivalent of 15 McDonald's outlets – by way of comparison McDonald's has 30,000 outlets worldwide; interestingly Starbucks goal is to have 30,000 outlets worldwide).

Fresh Content

Recognizing that the media kit model didn't have the juice to get it into the big leagues, Red Hat innovated once again in 2002 and invented the Enterprise Server – Maintenance and Support business model. Red Hat “gives away” its GPL Linux distribution but sells maintenance, support, and training linked to its distribution. The Enterprise Server model has worked very well for Red Hat, propelling their business to an annual run rate of \$260 million (equivalent to 175 McDonald's outlets, larger than the McDonald's franchise in 20 states – not bad). SuSE Linux, a rapidly vanishing part of Novell, has imitated the Red Hat Enterprise Server – Maintenance and Support business model with moderate success. (All indications are that Red Hat is trouncing SuSE in the marketplace.)

As the open source movement matures – as shown in Figure 2 – its opportunity frontier is shifting from the operating system to middleware to applications. Red Hat, as we have mentioned, is the clear winner at the operating system layer and as such its maintenance-based conversion business model is being imitated by venture-backed companies in the middleware layer.

JBoss appears to be a successful example of an open source middleware company that is pursuing the Enterprise Server – Maintenance and Support model. It's giving away its application server, which competes with the IBM's WebSphere and BEA's Tuxedo, and selling maintenance, support, and training. According to Joe McGonnell, director of marketing, JBoss is achieving about 250,000 free downloads per month across the JBoss branded products and Hibernate. Their Web sites are being visited by 260,000 unique visitors per month. This compares to 2.3 million unique visitors as measured by hosts per month at Apache. (One

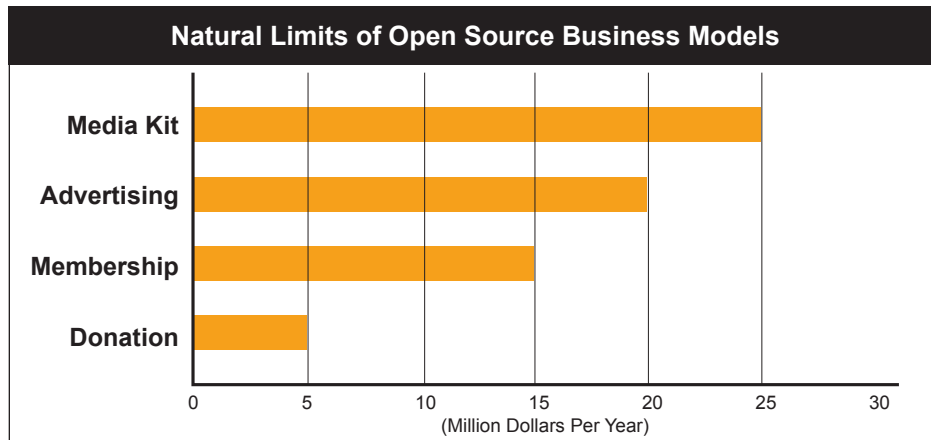


Figure 1

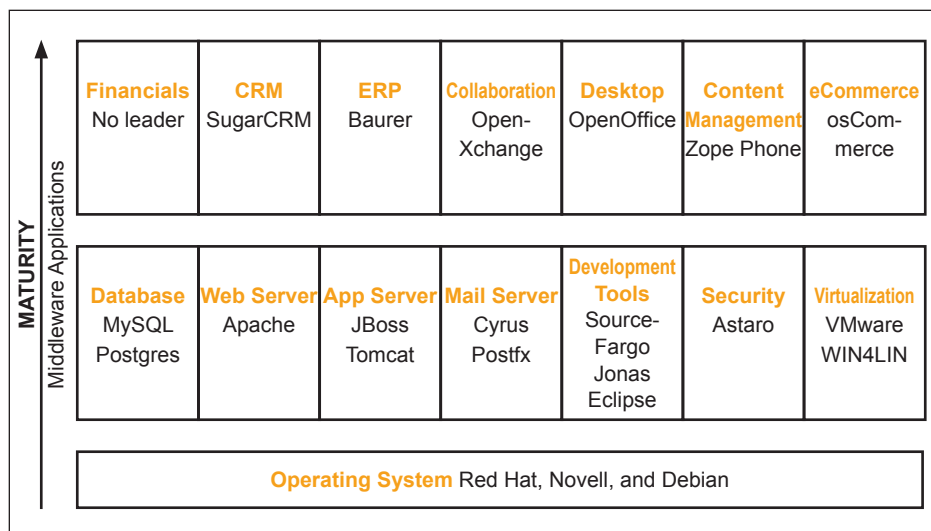



Figure 2: Category leaders in the open source ecosystem

way to double-check these numbers is to look at the popularity statistics page on www.freshmeat.net. There you will find JBoss ranked 249 [<http://freshmeat.net/projects/jboss/>] and Hibernate at 943 [<http://freshmeat.net/projects/hibernate/>]. In comparison, Apache ranks 11.)

The company's vice president of product management, Shaun Connolly, told ZDNet UK that JBoss has about 500 customers who each pay about \$35,000 per year for maintenance, representing \$17.5 million of revenue per year. In addition, JBoss sells support and training, which probably increases its annual revenue to \$30 million per year. JBoss has managed to break through the “glass ceiling” of the older open source business models by imitating Red Hat's Enterprise – Maintenance and Support model, evidence that the business model is viable for middleware.

In terms of go-to-market, JBoss has not been very forthcoming. They declined to answer our questions about the size and composition of their sales force. The danger of not giving information to a journalist is that he or she is then forced to guess. Nick Herring and I guess that JBoss is selling almost exclusively through a direct sales force calling on large enterprises, especially if they only have about 500 customers. So, in short, when you strip away all the open source trappings, JBoss is just another enterprise software vendor.

Which brings us back to my daughter's SAT question. I guess the answer is (B) enterprise software vendor, after all. Beware of wolves wrapped in the skin of open source projects.

Next month we will finally – we have been promising this for a long time – look at the Conversion model as it relates to selling good, old-fashioned enterprise software. 

OpenGear's CM4008

Console access at a great price!

By Matt Frye

I've been looking at a lot of console server and other out-of-band management solutions recently. These days, there's no shortage of console servers, appliances to manage console servers, and appliances to manage those appliances, each at enterprise cost availability.



But what if you're responsible for the network at a small business and you're looking for an out-of-band management solution on a small business budget? OpenGear's CM4008 provides secure out-of-band management for just under \$500. It provides real price performance in a convenient package for small business console requirements by leveraging the power of embedded Linux and open source. The CM4008 includes key networking and security modules (OpenSSH, OpenSSL, PAM, Netfilter/IPTables and so on) too. OpenGear has harnessed the power of open source to provide a secure platform for infrastructure management while keeping that platform economical for small businesses.

The CM4008 is small, about the size of wireless router, and has eight ports to connect servers via standard CAT5 cables (with serial adapters provided). The CM4008 easily integrates into your network by initiating a connection immediately via DHCP. The OpenGear Quick Start Guide (provided) says that the CM4008 will default to 192.168.0.1, but my unit picked up a DHCP address of 192.168.0.105, so this address seems to depend on your network configuration.

Open the address with your browser and the Web interface to the CM4008 greets you. Within minutes you can configure the serial ports to allow access via telnet, ssh, or raw TCP (see Figure 1). Other common serial settings can be

CM4008 Specifications

List Price: \$495

OpenGear Inc. www.opengear.com

Security and Authentication

- Secure Shell (SSHv2)
- IP packet and security filtering
- TACACS+, RADIUS
- PAP/CHAP authentication (dial up)
- User access lists per port
- Local authentication
- System event syslog

Management

- Web management (HTTP/HTTPS)
- Command Line interface (Linux Shell)
- SNMP
- Port triggers and alerts
- Port sniffing (simultaneous access to a port)
- Online data buffering
- Offline data logging (Syslog, NFS, CIFS)

Accessibility

- In-Band (Ethernet)
- Out-of-band (dial up) - modem access through DB9 port
- Local access (though DB9 serial port)

Other Protocols Supported

- DHCP for dynamic IP assignment
- NTP for time synchronization
- PPP for dial up access
- FTP, TFTP client for file transfer

Upgrades

- Flash upgradeable
- Unlimited free upgrades from online FTP site

Port Access

- Telnet/SSH to Linux shell
- SUN / Solaris ready – no inadvertent breaks
- Break over SSH support

Other Features

- Linux operating system
- Full source code access enables custom configuration
- SSH Sessions on all po

About the Author

Matt Frye is reviews editor of LinuxWorld Magazine, and a migration and technical support engineer at Tekelec, a leading developer of switching and signaling telecommunications solutions. mattfrye@linuxworld.com

configured, but no changes were necessary for me to proceed. I was also able to add a user via the Web interface and then authorize that user to one or all of the console ports. Once I had configured my user name, password, and the serial port I need to connect to, I configured a getty on my Fedora Core 4 box to allow console access on ttyS0. I added the following line to /etc/inittab:

```
co:2345:respawn:/sbin/agetty ttyS0 9600 vt100
```

Connecting to consoles is a snap without the need to learn any extra commands or syntax, and without any Java Web consoles. With the CM4008, you simply connect via the configured protocol using ports designated for each console port on the CM4008. For example, to connect to the serial console attached to port 1 on the CM4008 via ssh, I ssh'd to the address of the CM4008 on port 3001.

Example

```
ssh -p 3001 mfrye@192.168.0.105
```

Depending on which terminal emulator you use, you may see slightly different output to your screen. For instance, I initially tested the CM4008 with Putty and found that passwords I entered into the console session were visible. Testing with xterm in Fedora Core on my laptop showed no similar behavior (see Figure 2).

One of the pleasant features of the CM4008 is that you can connect to the serial console simultaneously from several different connections. Console access can be shared to allow teams to co-troubleshoot a problem, or for training purposes as output can be seen on any of the console connections interactively. For example, I was able to display an entire software migration to a team of new engineers by having them all log into the CM4008 on the same port.


All in all, I was very pleased with the simplicity, ease of use, and value of the OpenGear CM4008 and would recommend it to small IT shops who have a need for out-of-band or console management. The value provided by using embedded Linux enables OpenGear to pass enormous savings on to customers. As a result, even in the case of the CM4008's 16- and 48-port rack mountable siblings, the cost ends up being one third to one half of the list price of OpenGear's closest competitors. 



Figure 1



Figure 2

“ All in all, I was very pleased with the simplicity, ease of use, and value of the OpenGear CM4008 ”

PHP 5

Open source scripting for the heterogeneous enterprise

by Rick Fleischman

Enterprise IT departments face significant challenges in building applications that tie together heterogeneous business functions and data from a range of existing systems and applications. Existing portal applications are too rigid and inflexible to adapt to changing business requirements. Existing Java and J2EE application development tools are complex and sophisticated, requiring the commitment of expensive resources and long development cycles.



About the Author

Rick Fleischman is director of product marketing, Zend Technologies, Inc.

PHP 5, the open source Web scripting environment, provides the ideal environment for rapidly building these applications. PHP:

- Provides the ideal balance of simplicity, power, flexibility, and accessibility
- Incorporates native support for XML and Web services standards like SOAP, supporting enterprise application integration and service-oriented architectures (SOA)
- Directly interfaces with code written in C/C++, Java, COM/.NET, and Perl; and with data stored in a wide range of SQL databases

Through this support, PHP enables developers to quickly assemble Web applications that address pressing business needs without regard for where application functionality or data currently resides. PHP seamlessly abstracts the developer from the connectivity with these various systems, providing a simple PHP-based view that can be leveraged in building enterprise applications. In this way, PHP can be the glue that ties together functionality from diverse systems to address pressing business needs.

In this article, you'll also learn how PHP-based applications are built more quickly, are easier to maintain and adapt to changing business requirements, are deployable on any platform and Web server, and provide a robust and scalable execution platform proven through widespread Internet deployment and use.

PHP 5: What Is It?

PHP 5 is the latest version of PHP, the open source scripting language designed for building Web applications. PHP 5 adds a number of improvements and enhancements to PHP including improved support for object-oriented programming, XML, and Web services.

PHP, along with the Apache Web Server and Linux operating system, is among the most widely deployed and used pieces of open source software. PHP, according to NetCraft, has surpassed Microsoft ASP, making it the most popular Web scripting language and it's being utilized on over 15 million Web sites today.

PHP has proven itself across a range of large enterprise deployments at companies worldwide including Hewlett-Packard, Boeing, Lufthansa, Dresdner Bank, Disney Online, Yahoo!, Lycos, Sprint, T-Mobile, Orange, Nortel Networks, Lucent, WallStreetOnline, and Siemens.

How Is PHP Used?

PHP scripts are embedded within Web pages along with HTML, similar to other Web scripting languages such as Microsoft's Active Server Pages (ASP) or Sun Microsystems' Java Server Pages (JSP). Like ASP and JSP, PHP is a server-side language, meaning it runs on the Web server when a page is requested via HTTP, rather than on the Web browser or other client.

While there are many available tools for building Web sites, most were originally designed for some other purpose. Java, for instance, started out as a language geared toward client-side applets, not server-side servlets. The Perl programming language started life as a system administration tool and was later shoehorned into its role as a Web development language, resulting in structural problems such as memory leaks.

PHP is easy to use for Web development because it has been designed from the outset for the Web environment. That means that PHP has many built-in functions that make Web programming simpler, so that programmers can focus on the logic of programming without wasting precious development time.

PHP 5 Support for XML and Web Services

PHP 5 introduces new integrated support for both XML and Web services standards. These standards are gaining momentum in the enterprise as a universal language for communication between platforms and systems and for integration of application functionality. PHP 5 eases development with these standards by incorporating native support, shielding the developer from much of the complexity involved when working with XML and Web services in other Web development languages.

Native XML Support

XML is becoming more and more common as a data interchange format between applications and even between companies. XML is a standard for representing structured data along with customized tags, enabling the definition, transmission, validation, and interpretation of that data. Most applications being created today need to be able to create or consume XML data.

PHP 5 includes a powerful new capability called SimpleXML. SimpleXML allows developers to manipulate XML files as if they were PHP objects, meaning that any PHP developer can easily use XML without having to be proficient in XML parsing standards like Simple API for XML (SAX) or Document Object Model (DOM).

Here is a short example. Consider the following short XML file (people.xml):

```
<people>
<person gender="male">Joe</person>
<person gender="female">Judy</person>
</people>
```

This is the PHP code that accesses and prints the contents of the file (print_people.php):

```
<?php

$people = simplexml_load_file("people.xml");
foreach ($people->person as $person) {
    print $person . " is " . $person["gender"] . "\n";
}

?>
```

The resulting output of this code is:

```
Joe is male
Judy is female
```

The PHP code simply exposes the contents of the XML file as if they were elements in a standard PHP array. By iterating through the array with a simple loop, the content of the XML file is read and the output is created without any need to further parse the XML file.

There has never been an easier way to access and manipulate XML data. If there is some special XML manipulation that needs to be done in DOM, most of the basic work can be done in SimpleXML, and then the result converted to DOM and additional manipulations run without having to write and reread the XML data to some kind of temporary or permanent storage.



Benefits of Using PHP

PHP provides a number of unique benefits to enterprise developers:

- > **Rapid, iterative development cycles with a low learning curve:** PHP is easy to learn and use compared with other Web development languages. The language syntax is very readable and understandable, simplifying team development and maintenance. The code, embedded within HTML pages, can be quickly deployed and tested, supporting an iterative development process incorporating frequent user feedback. All of this leads to improved developer productivity and better resulting applications.
- > **Robust, high-performance and scalable platform; stable and secure:** PHP is designed for building Web applications that are scalable up to a very large number of users. Zend Technologies offers additional performance-enhancing tools for PHP, including sophisticated caching, content compression, and acceleration, enabling even further scalability. PHP is stable and secure, robust enough for business-critical applications requiring constant uptime and airtight security.
- > **Easily integrated into heterogeneous enterprise environments and systems:** PHP is fully interoperable with other languages, protocols, systems, and databases, including C/C++, Java, Perl, COM/.NET, XML/Web services, LDAP, ODBC, Oracle, and MySQL. As an open source product, PHP is deployable anywhere: on any platform, with any Web server, with any database. PHP is not tied to any proprietary platforms or technologies.
- > **Proven through widespread deployment and supported by a vibrant community:** PHP is the most widely deployed and used Web development language on the Internet, surpassing ASP, JSP, and Perl. The language has a vibrant community of users continuing to support and improve the language. The easy extensibility of PHP makes it very flexible in supporting new capabilities and enabling developers to take advantage of extensions done by others. There is a wide range of support Web sites, code samples, training classes, books, conferences, and available programmers with PHP expertise. Zend Technologies even offers a formal PHP certification program.

Web Services Support

The term Web services describes a standardized way of integrating applications using the XML, SOAP, WSDL, and UDDI open standards over an Internet protocol backbone. Web services allow different applications from different sources to communicate with each other without time-consuming custom coding, and because all communication is in XML, Web services are not tied to any one operating system or programming language. For example, Java can talk with Perl, and Windows applications can talk with UNIX applications.

PHP 5 features new native support for SOAP and WSDL making it incredibly easy to create and consume Web services within the enterprise or on the Internet. For example, all that is required to access a Web service is to point to a relevant WSDL file describing that service and then simply invoke a function exposed in that Web service interface. Only two lines of code are required!

Here is a specific example of the PHP code required to access a Web service exposed on the Internet to print the current stock quote for Microsoft:

```
<?php

$client = new
SoapClient("http://services.xmethods.net/soap/urn:xmethods-
delayed-quotes.wsdl");

print($client->getQuote("MSFT"));

?>
```

All that was required was to create an object by passing in the relevant WSDL, and then access a function in the Web service by invoking a method within the object.

It's similarly easy to publish Web services. The services are implemented as PHP-based classes, and then described in a WSDL file. PHP 5 has built-in capabilities to publish that service, provide the WSDL on request, and execute the functionality and return a result (if needed) when invoked.

Rapid Prototyping and Assembly Using Web Services

The seamless XML and Web services support in PHP 5 enable a developer to quickly prototype and deliver applications that assemble together capabilities exposed via Web services. The developer doesn't need to focus on the details of parsing XML files and piecing together SOAP messages. Rather, the developer can focus on the business needs being addressed by the application. This results in rapid development, early prototyping and feedback, frequent iteration, and a robust resulting application.

PHP Integration with Existing Code and Data

In addition to support for emerging standards like XML and Web services, PHP provides a comprehensive set of interfaces with existing code libraries and databases that may exist within an enterprise. This makes PHP ideally suited to exploit functionality and data in these various environments, and to expose them to other applications or enterprises using Web services. PHP provides integration with C/C++, COM/.NET, Java, Perl, and SQL databases.

C/C++ and COM/.NET

PHP is written in C, and has a powerful extension interface allowing

“ PHP is an enterprise-ready scripting language ideally suited for quickly building and deploying Web applications ”

new capabilities to be added to the language using C and C++. It has equally powerful capabilities to allow PHP code to connect with existing libraries written in C/C++, as well as COM and .NET on the Microsoft Windows platform.

Microsoft COM (Component Object Model) defines a common calling convention that enables code written in any language to call and interoperate with code written in any other language. Microsoft .NET is an overall strategy for providing individuals and businesses with a seamlessly interoperable and Web-enabled interface for applications and computing devices based on XML and Web services. It supports over 20 programming languages and allows for interoperability between these languages. Microsoft intends to offer a range of Web-based services and application building blocks via .NET.

COM and .NET access are built in to PHP 5 and are available to any PHP code running on the Microsoft Windows platform. The COM class in PHP allows you to instantiate a COM object, call its methods, and access its properties. The DOTNET class allows you to instantiate a class from a .NET assembly, call its methods, and access its properties. PHP does this via the COM interoperability layer for .NET. In implementation terms, PHP sees .NET objects as though they were COM objects.

Java

Zend Technologies is working with Sun Microsystems on JSR 223, a specification to describe how to write portable Java classes that can be invoked from a page written in any scripting language, with PHP serving as the reference scripting language implementation. Through this specification and reference implementation, it's very straightforward to invoke Java code directly from PHP, enabling existing Java code libraries and application functionality to be incorporated into PHP applications.

This example shows how straightforward it will be for PHP code to use a Java Bridge to access a database using the JDBC APIs in J2EE:

```
<?php

$host = 'localhost';
$db = 'test';
$user = 'test';
$pwd = '';
Java("com.mysql.jdbc.Driver"); // init

$conn = Java("java.sql.DriverManager")
```




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```

->getConnection("jdbc:mysql://$host/$db", $user, $pwd);
$stmt = $conn->createStatement();
$rs = $stmt->executeQuery("SELECT * FROM news");

while($rs->next()) {
    printf("On %s article %s\n", $rs->getDate("when"),
        $rs->getString("title"));
}

?>

```

Java objects are simply invoked using the `Java()` function directly from the PHP code. Once a Java object is instantiated and assigned to a PHP variable, methods can be invoked on that object as if it were a PHP object, completely transparent to the programmer.

Perl

The PHP Perl extension is a simple one-way binding from PHP to Perl. It allows you to execute Perl code from PHP, and has the ability to access Perl variables, call Perl functions, and instantiate Perl objects. Through this extension, existing code in Perl can be incorporated into PHP applications.

To access the Perl interpreter from PHP, you must first create an instance of the Perl class:

```
$perl = new Perl();
```

This line of code creates an instance of the Perl interpreter. It is possible to create several instances of the interpreter, but all of them will use the same one internally, so that all code and variables will be shared across instances. The object `$perl` can be used to execute external Perl files, evaluate inline Perl code, access Perl variables, and call Perl functions.

Perl code can be executed from an external file, or embedded in-line into the PHP code and evaluated on-the-fly. Here's an example of Perl code embedded in-line within PHP code using the `eval` method of the Perl class:

```

<?php

print "Hello from PHP!\n";
$perl = new Perl();
$perl->eval('print "Hello from Perl!\n"');
print "Bye!\n";

?>

```

SQL Databases

PHP offers high-performance direct connections to the most widely used SQL databases. PHP is commonly used with the open source MySQL database. There is also direct support for ODBC and a wide range of additional databases including Oracle, IBM DB2, Microsoft SQL Server, Informix, Sybase, and PostgreSQL. PHP also supports database abstraction layers, enabling multiple databases to be accessed using a single interface.

Here is an example of a simple MySQL query from PHP:

```
<?php
```

```

$conn = mysqli_connect("localhost", "test", "", "world");
$result = $conn->query("SELECT name FROM city");
while ($row = $result->fetch_row()) {
    print $row[0] . "<br>\n";
}

?>

```

This code opens a connection to the database, executes a query against that connection, and then iterates through the resulting rows, printing each on a separate line.

Here is a similar example accessing an Oracle database:

```

<?php

$conn = oci_connect($user, $password, $db);

$stmt = oci_parse($conn, "SELECT name FROM employees");
oci_execute($stmt, OCI_DEFAULT);
while ($row = oci_fetch_assoc($stmt)) {
    print $row["name"] . "<br>\n";
}

?>

```

New in PHP 5 is support for SQLite, an embedded database that allows use of SQL without having access to a full-blown database server. Contrary to the implications of its name, the SQLite database has many features, such as support for transactions, sub-selects, and other advanced database features. Although it might not be suitable for all uses, especially on systems that deal with heavy and frequent database updates, it's very suitable for most other projects, such as applications with a high frequency of database reads and less frequent writes, or as a powerful replacement for flat files in applications.

Conclusion

As you have learned in this article, PHP is an enterprise-ready scripting language ideally suited for quickly building and deploying Web applications that tie together heterogeneous business functions and data from a range of existing systems and applications.

PHP provides the ideal balance of simplicity, power, flexibility, and accessibility that is lacking in other languages and tools for enterprise development. Developers using PHP come up-to-speed quickly and build code that is both powerful and maintainable, reducing development time frames and costs.

PHP easily integrates with an existing enterprise infrastructure through native support for XML and Web services, as well as the built-in capability to interface with code libraries written in C/C++, Java, COM/.NET, and Perl; and data stored in a wide range of SQL databases.

All of this taken together demonstrates why PHP is ideally suited to be the glue that can enable the assembly of applications combining together functions and data that exist in systems across the enterprise. The resulting unified business processes can easily be provided to users through a Web interface, or exposed via Web services to other systems within the enterprise or to other companies across the Internet.

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Strengthening Open Source's Weakest Link

Broader, more collaborative open testing can yield more meaningful results for business and developers alike

By Murugan Pal

Pop quiz: If one open source user tests 30 percent of an application, and another tests 20 percent, how much of the application has been tested?

The answer is probably closer to 30 percent than 50 percent, since both users probably focused on common functions like start-up, shutdown, and data access. The problem gets amplified if the application is built for n-tier deployment based on service-oriented architecture, newspapers and broadcasters. The service handles between 150,000 and 500,000 pages of content per affiliate per day, supporting 11,000 concurrent users. MySQL, a free open source database, has been the backbone of AP Hosted News since 2002.

Everyone knows that the cornerstone of open source software is the free availability of its source code, which lets developers and users around the world contribute to it and improve it. The software naturally becomes stronger as it accumulates improvements and sheds imperfections. The quality improves based on more usage and reviews.

But the model breaks down when it comes to making sure the software actually works in real-world deployment scenarios. The power of participation has been confined almost entirely to the development phase of the software life cycle. Testing remains open source's weakest link as it is difficult to reproduce all intended usages.

While code repositories and other shared resources help developers revise and build upon the efforts of their peers, the testing of that software has remained an uncoordinated, isolated affair. Instead of learning from and enhancing each other's tests, users and developers test the same functions and routines, and have no way to easily share their results with each other.

Because most testers are testing only on the platform they happen to be using, most test results aren't widely applicable. Results that show how well a piece of software works on a particular platform might not say much about how well it works with a different operating system, or how well it interacts with other software components. That's a major shortcoming, since open source software components are mostly used as part of a stack with other components.

A Moving Target

The constantly changing nature of many open source programs makes meaningful results even harder to come by. To get results that would be accurate and meaningful to a broad section of the open source community, a user would have to constantly retest it on an ever-growing number of platforms (which are also changing).

As a result, some of the biggest challenges of open source software have remained intact. "Dependency hell," (Jar Wars and DLL Hell) in which each piece of software relies on a specific version of another piece of software, continues to be a constant time drain for many IT departments. Not only are the dependencies difficult to resolve, some times you end up with redundant footprints of the same libraries embedded in the integrated runtime (e.g., Log4J in Tomcat, Struts, etc.).

What if the open source development model – the "architecture of participation," to use Tim O'Reilly's phrase – could be extended to software testing? If users could easily access, build upon, and contribute to a growing body of open source tests, testing could become an extension of the participatory development process. Fixes could be validated faster, and



About the Author

Murugan Pal is founder and CTO of SpikeSource.

functionality and backward compatibility across different versions of integrated software components would be easier. Even enterprise customers can participate in this model by validating their tests on integrated hardware and software runtime environments.

Participatory testing would also help certify the interoperability of the exponentially increasing combinations of component choices. Most businesses use open source software not in isolation, but in stacks of interoperating components. Tests should be able to tell you exactly how well those components work together.

Just as the participatory development community relies on open resources and information repositories for source code, the participatory testing community should have open resources for testing—including open tests, test manifests, test results, and interfaces/protocols to share test results and tests.

That's where SpikeSource want to be a catalyst in promoting participatory testing. We provide all of those resources, as well as an environment for open source software users and developers to share, obtain, and exchange federated information about open source testing.

“The ultimate goal is to make open source software more scalable and predictable”

Businesses can upload an application to SpikeSource's open testing tool, which continuously pulls code from open source repositories and builds its own repository of different versions of different components and operating systems. SpikeSource automatically constructs systems out of those repositories, provisions them on virtualized runtime environments, tests them, and records the results.

Interoperability Is Key

For most businesses, how well a component works with others is just as important as its independent functionality. For example, if there's a change to the Apache servlet engine Tomcat, a test should show how those changes impact other components like JK2, Connector/J or MySQL.

The ultimate goal is to make open source software more scalable and predictable, so that business can use it in conjunction with or as an alternative to proprietary software. Our goal at SpikeSource is to help further the enterprise adoption of open source software. Through testing, it becomes more reliable, easy, and safe for enterprises to deploy. ○



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Open Source and the “Mixed-IP” Environment

Understanding the IP ownership issues behind your software assets

By Kevin Bedell

Every company that develops software whether for internal use or to sell to customers is now working in a new “mixed-IP” environment created by the spread of Open Source. This new environment’s impact on software development has been dramatic.

A mixed-IP environment means that virtually all software developed today is a mix of proprietary software and Open Source programming libraries. And while this environment has dramatically accelerated software development, it has also muddled the waters with respect to understanding the intellectual property (IP) ownership issues behind one’s software assets. If you or your company develops software, you need to understand what’s going on.

There’s no arguing that the impact of Open Source on IT has been huge. The impact of Linux alone has been incredible, with IDC recently forecasting that the market for “desktops, servers, and packaged software running on Linux will exceed \$35 billion by 2008.” By anyone’s standards, \$35 billion is a lot of money.

But the impact that Open Source is having on software development is in many ways more dramatic than its impact on IT, yet it isn’t talked about nearly as much. It’s difficult to find out, for example, the dollar impact that Open Source programming libraries have had on software development. But while I don’t know the exact number, I can tell you it too has been huge.

The Two Categories of Open Source

At a high level, Open Source code can be separated into two categories: full applications and programming libraries. This is illustrated in Figure 1.

From this figure, you can see how these two groups break down. Open Source applications are applications that you can use immediately to solve business problems. The Apache Web Server and Linux are great examples, but there are thousands of others that are less well known. These applications are reshaping the IT landscape by providing organizations of all kinds with free high-quality applications they can put to work immediately.

Open Source programming libraries, however, are less visible and less well known than the major Open Source applications. But in some ways, they are having an even greater impact. For example, while not every IT shop uses Linux yet, virtually every programmer today is using Open Source programming libraries.

Virtually every Java programmer, for example, uses Sun’s JDK to write and run Java programs. Not all of them realize, however, that Sun’s JDK includes copies of Open Source programming libraries for XML, XSLT, and XPATH processing. These programming libraries come from the Apache Software Foundation and are included at no cost in the JDK.

Sun includes these Open Source programming libraries in Java for the same reason that other companies use Open Source programming libraries – they are high-quality libraries with rich feature sets that can be used and distributed by them at no cost.

What would it cost Sun if it had to develop all this functionality internally? It would certainly be significant. Not only that, Sun would also lose the advantage of being able to use code that’s already widely used and debugged. The Apache XML libraries are used by thousands of applications around the world and they’re solid. It wouldn’t make business sense for Sun to write XML processing libraries when these other libraries are available and free.



About the Author

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For the same reasons, it doesn't make sense for any other company to write XML processing libraries either. Why waste time writing XML processing libraries when your developers can be focusing on important things like implementing new features to solve important customer (or internal) problems?

And Java XML processing libraries are just the tip of the iceberg. Open Source programming libraries are available for virtually any programming problem today regardless of the language you program in. There are libraries available for building graphical interfaces, for processing complex math algorithms, for security, for e-mail processing, for generating reports and graphs, and for virtually any other common programming task.

The result of all this is that there has been a massive shift from programmers working on low-level development tasks to writing code that leverages Open Source libraries and focuses efforts on higher-value activities involving the actual business logic in their applications. The net result is that there have been huge gains in programmer productivity; programmers can now build applications dramatically faster. As a result, they can spend more time focusing on what their users need.

But these benefits haven't come without challenges. These challenges are related to understanding the IP ownership issues behind software assets.

Open Source's Impact on Software Assets

Before Open Source programming libraries were widely used, understanding the IP ownership of a software program was relatively simple. Basically, companies either developed all their own software or licensed source code from some third party. Figure 2 demonstrates this.

In any case, it was clear who owned what. Besides, they had contracts that spelled out exactly what their rights were with regard to the proprietary/licensed code they got from third parties.

Contrast this with the following Figure 3, which shows how software assets are structured now that companies are leveraging Open Source programming libraries.

As you can see, the Open Source libraries are now a core part of the software asset. The software asset requires these libraries to run; without them the software program doesn't work.

On the one hand, this dependency brings with it a significant increase in the productiv-

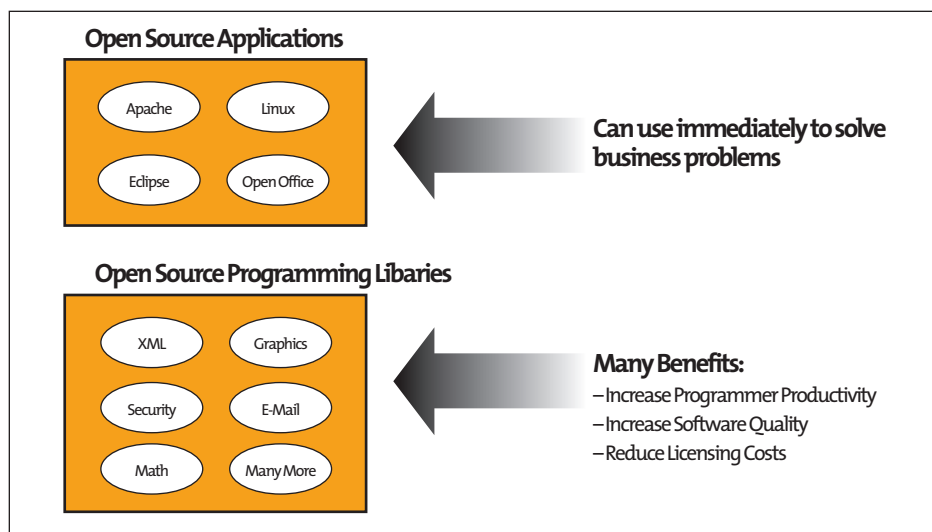


Figure 1: Two major groupings of Open Source

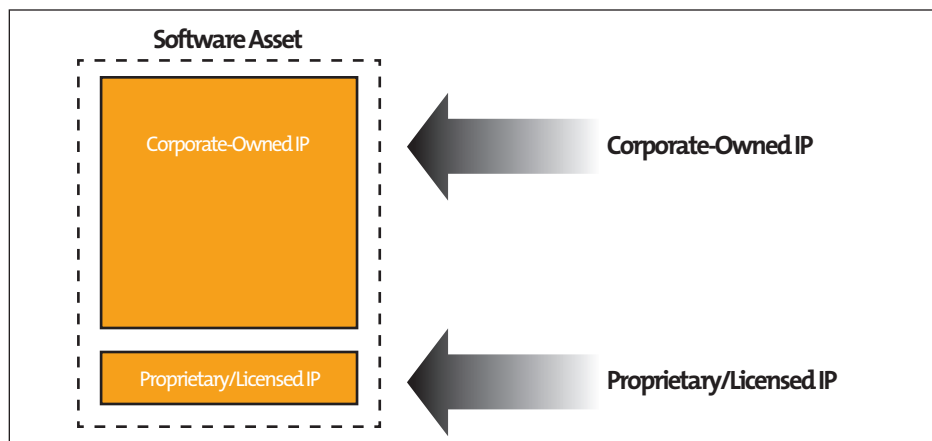


Figure 2: Software assets before Open Source programming libraries

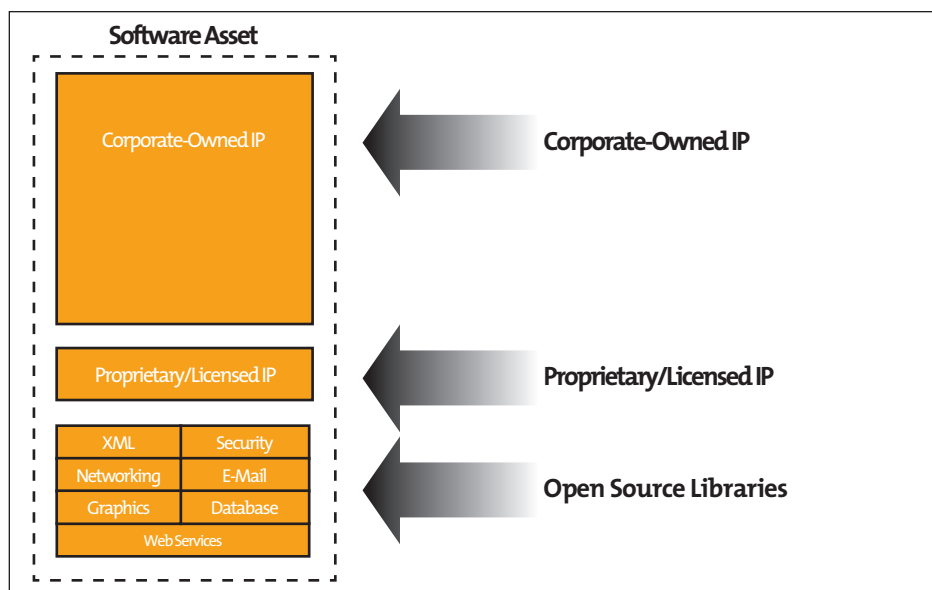


Figure 3: Software assets after Open Source programming libraries

ity of the company's development staff. It can get much more done using Open Source libraries, but some dependencies are built into the application that weren't there before.

Besides increasing the productivity of a company's developers, using Open Source libraries can sometimes make it affordable to build applications that would otherwise cost so much to develop that they'd never get built. In these cases, accepting the dependencies on Open Source libraries is the only choice available.

On the other hand, these new dependencies raise some new questions. One important one is, "Who owns the software asset now?" The company owns the code it wrote itself, of course. And the proprietary/ licensed IP is owned by whoever developed and licensed it to them. But now things are more complicated; who owns the Open Source programming libraries and how does that impact ownership and licensing of the software asset as a whole?

Who Owns Your Software Asset Now?

Figure 4 tries to demonstrate the ownership of the software asset.

As you can see, the Open Source libraries make understanding the ownership of the overall software asset a lot more confusing. Considering that many software programs contain literally dozens of Open Source libraries, it's easy to see that determining ownership of a company's software asset can be virtually impossible when significant amounts of Open Source are used.

This stems from the fact that copyright law governs software ownership. Copyright laws stipulate that source code is owned by its original developer except in a few cases such as when the developer was an employee of a company when he did the work or if the original developer specifically assigned the copyright to his code to someone else.

To clarify the conditions under which people can use Open Source, these libraries are licensed using Open Source licenses such as the GNU General Public License (GPL), the Mozilla Public License (MPL), or the BSD License. (For more information on these licenses, or on Open Source licensing in general, see <http://www.opensource.org>)

How Does Open Source Licensing Impact Your Software Asset?

Figure 5 demonstrates the various licenses that might apply to a company's software asset.

In this figure, the portion of the software asset owned by the company has been omitted since it doesn't need a license to use software it owns outright.

The proprietary/ licensed IP (or third-party code) is generally used under terms that are negotiated between a company and whoever owns the code. A company's lawyers usually review these terms before any agreement is reached on using the software.

Open Source libraries normally all come with licenses as well. Some of these licenses are long and complex and were written by lawyers who have a deep understanding of software licensing. At the other end of the spectrum, some were written by software developers with a very limited knowledge of licensing.

For example, here's the full text of a license written by one Open Source developer:

```
/*
 * -----
 * "THE BEER-WARE LICENSE" (Revision 42):
 * <phk@FreeBSD.ORG> wrote this file. As long as you retain
```

this notice you

* can do whatever you want with this stuff. If we meet some day, and you think

* this stuff is worth it, you can buy me a beer in return
Poul-Henning Kamp

```
* -----
*/
```

So, clearly, if you use code licensed under "THE BEER-WARE LICENSE" then you need remember that you'll have to buy Poul-Henning Kamp a beer someday if you ever meet him.

Not all Open Source licenses come with such generous terms. For example, one common requirement for using Open Source libraries is that you agree not to sue any of the people or companies that contributed to the Open Source library for patent violations (even if they sue you first). If you sue them, then your license to use the Open Source library is revoked. This would be a big problem if one of your core software assets needed that library to work.

Some licenses (called "copyleft" or "reciprocal" licenses) insist that if you ever distribute your software to another company you must also provide that company with a copy of your source code – and that you license your source code to them under the terms of an Open Source license. For companies that provide software to their customers or business partners, these licenses can cause big problems.

In the end, by understanding which licenses are appropriate for the needs of a company, it's possible to manage which Open Source libraries get used so that the programmers (and the company) can stay out of trouble.

“ Open Source and the mixed-IP environment describe the new reality of software development for most companies. ”

Software Compliance Management

So we've seen that using Open Source programming libraries can be a huge benefit for companies looking to increase the productivity of their software development teams. We've also seen that companies need to make sure they understand the licenses they need to be in compliance with. They also need to choose Open Source libraries whose licenses meet their overall needs.

The process of understanding licensing requirements for the Open Source (and licensed/proprietary) source code and libraries that you use is called software compliance management and it's a fast-growing discipline.

The goal of software compliance management is to make sure that companies plan and manage their software licenses to stay in compliance with all their obligations.

There are a variety of important pieces to the overall software compliance management puzzle. Here are a few of them:

1. Understanding the Company's Needs

Effective software compliance management begins by knowing what a company's needs are. For example, is the company going to provide the software to customers or business partners? If so, then it'll need to be careful about using Open Source libraries that require you to distribute source code when you distribute applications.

2. Planning and Licensing Management

It's critical that any software compliance management program have a planning component. This helps companies avoid situations where they find out at the last minute they have Open Source code or libraries in their products or projects that they didn't know about. Nothing could be worse than finding out just before shipping a product that there are Open Source libraries or code in it that could cause the company problems.

Licensing Management is the part of the planning process where companies evaluate the overall licensing requirements that result from combining Open Source libraries under different licenses and make sure that they understand the overall licensing picture for a software product or project. There are new software programs appearing that let companies "model" their software assets and calculate the overall licensing requirements of the assets.

3. Analyzing Source Code and Resolving Issues

Before shipping a product (or launching an internal project), the software asset should be reviewed for overall licensing compliance. Issues should be identified and tracked to resolution.

In situations where portions of a project were developed by outsourced and/or offshore developers, a similar analysis should be done on the software they deliver as part of the overall acceptance process.

4. Ongoing Compliance Management

After an initial analysis and resolution of issues, compliance management should be part of the overall software lifecycle. As new features are implemented and new releases planned, licensing issues should be tracked and managed as part of the process.

Summary and Conclusion

Open Source and the mixed-IP environment describe the new reality of software development for most companies. This new environment provides some huge opportunities, but brings with it new challenges. These challenges center on understanding how Open Source impacts the ownership and licensing of software assets. Software compliance management defines the process by which companies understand and manage the Open Source licensing issues related to their software assets.

So what should you do? How should you begin to incorporate these ideas into your company? How can you take advantage of Open Source in a managed way to gain the tremendous productivity benefits I've described? Well, the first steps are just to be aware of the opportunities and risks. Simply understanding the opportunities in front of you is definitely a start. Understanding how Open Source licensing works and which licenses work for your company follows right behind.

Understanding the importance of software compliance management in keeping the licensing aspects of your software assets under control should be your goal. Understanding and managing the licensing of your software assets is going to be critical as Open Source becomes an ever-greater part of the software development landscape. ○

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The Open Source Business Conference

Bringing together the business and open source communities

Interviewed By Bill Claybrook

Matt Asay, the founder of the Open Source Business Conference, discusses his views on the conference and open source businesses and products. Matt works at Novell as director, Open Source Strategy. Prior to Novell, he worked with Lawrence Lessig at Stanford and subsequently at Lineo.



Matt Asay

About the Interviewer

Bill Claybrook is president of New River Marketing Research, a marketing research firm that focuses on Linux, open source software, and commercial grid computing. He performs primary research and helps marketing organizations plan for new product offerings and develop go-to-market strategies, as well as develop marketing analysis content. Prior to entering commercial computing and marketing research, he was associate professor of computer science at Virginia Tech and the University of Connecticut, as well as professor of software engineering at the Wang Institute of Software Engineering.
bclaybrook@newriverlinux.com

LinuxWorld Magazine: Why did you initiate the Open Source Business Conference (OSBC)?

Matt Asay: No one seemed to have an answer to the question: How to make money with open source? I set up the OSBC by working nights and weekends to try to bring together a group of smart people to discuss how to make money with open source. We started out primarily as a vendor conference discussing how to create strategies for viable businesses around open source.

LWM: When was the first conference?

MA: The first conference was in March 2004 in San Francisco. Now there are two events: OSBC West and OSBC East. The Western event has settled in San Francisco and so far the Eastern event is being held in the Boston area. We are considering one in Europe and maybe one in Japan. We brought in IDG to offload the logistical work so that we could focus on content. The OSBC has morphed into being more than just a vendor strategy conference. Last year we had a 5x increase in IT executives and quite a few CIOs. The CIOs like the show because the conference tries to maintain an objective stance to provide a forum where participants can openly argue issues. So we don't have a back and forth between Linux and Microsoft people.

LWM: Who attends, should attend OSBC?

MA: We have four tracks: venture capitalists and early stage startup folks who are given help in finding out where the good investments are; attorneys (they make up 15% of the attendees) who address the legal issues around open source; CIOs and other director-level and

above people; and vendors – IHVs/ISVs. Over 80% of the attendees are director-level and above – decision makers.

LWM: What value do the participants who attend OSBC receive?

MA: We find that there is a lot of cross pollination – attorneys attending business tracks and business people attending attorney tracks. Attendees can walk away with a good understanding of the legal issues and how to deal with them in and around open source. They will also understand the trends of open source, and the companies pushing these trends will be there to meet with people who have questions. For the first two OSBC events, many of the startups, now funded, were there still in stealth mode – startups such as EnterpriseDB and SpikeSource. Someone walking in can see what their peers are using for business models. There are frank, open discussions at the event where people talk freely about their business strategies. OSBC brings the open source community to the business community.

LWM: Are most attendees knowledgeable about open source?

MA: On average, people tend to be knowledgeable, but we get different classes of folks: attorneys, startups with people experienced in their industries, but who don't know much about open source – they come to learn about business models and meet the players; experienced people from HP, IBM, etc., and other people from vendors who are looking to get their feet wet attend as well. On the IT side, the buy side, attendees tend to be CIOs. We don't assume a deep level of understanding of open source from them. So the CIO track is pretty much the nuts and bolts of what are the trends, who's using it, how are they using it, and case studies.

LWM: How are open source companies going to fare over the next few years?

MA: There are some promising companies such as MySQL and JBoss. The business models are maturing and the companies are

maturing. The dual license model seems to be working. The mixed source model works – SugarCRM, Novell, etc. The future for open source businesses is bright. Some view open source companies as just service and support business models that are low on innovation. This may have been true five years ago, but the more interesting companies that are being funded right now aren't support model companies.

My feeling is that there will be fewer companies following the model of generating revenue from support and service and more of the companies with hybrid models where they are mixing open source and proprietary codes. Alfresco (provider of content management) didn't start as an open source company, but what it found is that the big enterprise license sale is not going over very well with CIOs any more. They want subscription-type pricing, more intimacy with their vendors. They want something that works, and they want to spend as little time as possible worrying about their IT. It turns out that open source, versus closed source, is a very good way to reach their goals. Microsoft will thrive for several years with its integrated innovation policy of tightly integrating components. The downside of that is that unless you are willing to buy into Microsoft 100%, it's not a very good model. There will be loosely coupled business models of the world that will pull together open source products without having to buy into one infrastructure such as the Microsoft model. Many CIOs are pushing back on Microsoft because they want choice. I think that the future is very bright for open source.

LWM: *The first wave of open source products were infrastructure based and the business application companies such as Zelerate, etc., failed. Are the open source business application companies set to succeed now?*

MA: The first wave of successes was Linux and Apache. The next wave included databases and application servers. We are now in the third wave – the business application wave. Applications didn't work out before because they were still application projects struggling to make it on their own; whereas what we are seeing now in the third wave are companies launching projects, the influx of the company component – a company going out there and using open source as a distribution mechanism to lower marketing and sales costs.

Linux and Apache were driven, at least initially, by the community. Companies such as JBoss and MySQL are driven less by the open

source community. For example, MySQL does 90–95% of its own development. It employs the engineers who do most of the development. They get language packages, bug fixes, etc., from the outside. But what they get most from open source is distribution – 10 million downloads, some of which come back and buy support. JBoss does about 85% of its development and the rest comes from open source. MySQL and JBoss were never truly open source projects. I'm not sure that there are "true" open source projects out there, at least not the big successful ones. There has always been a heavy corporate component to them – certainly to the extent that they became relevant to the enterprise. We had some angst about it for a year or two, but now we realize that it is okay for companies to be profiting

stack may struggle over time, struggle internally to develop the best software out there, struggle to build it all themselves purely on open source because they don't believe in some of the other models.

LWM: *Linux versus Microsoft?*

MA: For the next few years, UNIX will be migrated to Linux. Eventually Linux and Microsoft will become engaged in a massive battle after boiling beneath the surface for a few years. At some point, CIOs will have to decide who they want to control their data centers. Some will say, I don't want to be bothered with it, and they'll let Microsoft have control. The other half of the world will say, we want to control our data centers; we are willing to invest the time and open source is maturing.

“ I tend to think that the people who buy into Microsoft will feel increasingly frustrated and as long as the open source side does its job well... ”

from open source. It's great when SugarCRM releases valuable code into the open source community. Now that the perception of capitalism in open source has softened, we see the third wave of business applications, ripe for development, and it will be companies doing it more than the open source projects doing it.

LWM: *Do you see companies that claim to be developing only an open source stack being able to make it long term?*

MA: I don't know. I don't think that CIOs really care. They buy open source because it is less expensive; they have a large choice of hardware; and it lowers the barrier of trust that they have to have with their vendor because they don't have to count on the vendor being benevolent or around forever. In addition, they have access to the source code. I'm not sure that any CIO buys open source just because it's open source. CIOs want flexibility, choice, etc. The companies that have an open source-only

I think the eventual split will be about 50-50. I tend to think that the people who buy into Microsoft will feel increasingly frustrated and as long as the open source side does its job well and makes it easy to deploy a Linux data center, Linux will keep taking a healthy share of the business. It's up to the Linux/open source side not to screw up. We tend to think, on the open source side, that we can do no wrong. Microsoft does some things very well. They make computing much easier for the average person and, at the end of the day, most of us are average people. Linux has to get out of its development shell, where developers are writing code for other developers. We are well along this path, but we need to do better. I think that the data center will eventually be won by Linux, but it will require something like bringing down the bar on the skill set required to make that happen. We are going in that direction. ○

Should Open Source Apps Run On Windows?

The great debate

By Jon Walker

There's been some interesting debate in the Open Source community regarding Open Source applications that run both on Linux and Windows. One camp feels most users select an operating system based on its available applications. If the applications people want are on Windows, they will tend to stick with Windows. Conversely, if the applications they want are only on Linux, they will eventually end up using Linux.



About the Author

Jon Walker serves as CTO of Versora, an ISV providing Windows to Linux migration software. He has co-authored five whitepapers with Novell and MySQL. Prior to Versora, Jon was CTO/VP of engineering for Miramar Systems. Software developed under his direction at Miramar has been deployed to over 20 million computers worldwide. He has also served as senior technologist for Nortel and Xing Technology (now Real Networks). jonwalker@sys-con.com

By porting free software to Windows one increases the valuable applications on that platform. If Windows has Microsoft applications plus a stable of free software apps while desktop Linux has only the free software apps, why would anyone switch to Linux (and incur the training and data migration costs) when they already have all the software they need and want right? And as long as Microsoft can keep people on Windows Microsoft will gain the time needed to improve its applications and, most importantly, the supporting software stack.

The second camp feels that Open Source applications that run on both Windows and Linux is an important step in "mainstreaming" Open Source and Linux. Since most desktops run Windows, why not infiltrate (and infuriate) the Empire with Open Source applications such as Firefox and MySQL to "seed" the masses with the concept that Open Source is ready to be used beyond the intimidating world of the techies. Giving users the chance to use an Open Source application on Windows lets them get comfortable before migrating to Linux. Anyway, a transitional desktop (that runs Open Source applications on a Windows platform) is an important first step in migrating to a Linux desktop.

I was interested in posing questions on this topic to various people that work with, contribute to, or provide customer support and consulting for Open Source applications that run on Windows and Linux.

Featured Panelists:

Marten Mickos:
CEO, MySQL AB

Andy Astor:
CEO, EnterpriseDB

David Boswell:
Member, MozDev Community Organization

Do Open Source applications on Windows hurt or help Linux adoption and why?

Marten Mickos: For the most part, this question is irrelevant. Open Source products don't exist to hurt or help other Open Source products – they exist to deliver value that hasn't been available before. Linux is likely to grow significantly in the market irrespective of whether Open Source applications make it or don't make it on Windows. But I think it's also good to offer users a wide selection of platform choices and let them decide which they want to use.

Andy Astor: They help, but only a little bit. Once Windows people see the quality of Open Source software, as well as products based on Open Source, they may consider looking for more Open Source in their infrastructure stack. But since the total cost of ownership for commercial Linux and Windows is relatively comparable, Windows lovers aren't going to be particularly motivated to switch.

David Boswell: Anything that helps bring attention to Open Source software should help the adoption of Linux and other applications. Although Linux is well known in technical circles, computer users as a whole are largely unaware of alternatives to Microsoft and other popular proprietary applications. Introducing people to Open Source software by installing Firefox on their computer won't necessarily make them Linux converts, but it's a start.

From an enterprise perspective, should you adopt Open Source applications on Windows before considering moving to Linux?

Andy Astor: I would say no. People new to Open Source will find much more education in a Linux environment than they will in Windows. Experimentation is probably best in Linux.

David Boswell: Introducing Open Source applications on existing Windows systems before switching to Linux makes a lot of sense. On Windows, OpenOffice and Firefox can live side by side with Microsoft Office and Internet Explorer. This lets people get familiar with these new applications without having to learn a whole new operating system at the same time. If an organization does make a switch to Linux later, the time spent with Open Source applications on Windows isn't wasted since those applications, like Firefox and OpenOffice, are essentially the same on both platforms.

Drilling down on those using Open Source apps on Windows – are these new users or are they migration users?

Marten Mickos: The majority of MySQL users (on any platform) started fresh on MySQL and didn't migrate. But now, with MySQL's stronger enterprise presence, we see a growing number of customers who are migrating from legacy databases over to ours.

David Boswell: My dad is a recent Firefox convert and he hasn't used any Open Source software on his computer before. He made the switch out of concerns with Internet Explorer security. I think he's fairly typical of users who are being introduced to Open Source initially through desktop apps like Firefox or OpenOffice. People will use the browser and productivity applications that came with their Windows machine and only install new software if they are looking for an alternative.

What percentage of development efforts is used to create the Windows version of Open Source applications as opposed to the Linux version?

Marten Mickos: When it comes to platform support, our first priority is to write source code that runs unaltered on any operating system from the start. Thereafter we spend a fairly reasonable amount of time and money on tuning and trimming for a specific operating system. We devote those efforts in proportion to the size of the business opportunity on the operating system in question. We are not a non-profit. We want to make money!

David Boswell: For Open Source applications that run on multiple platforms there's a huge incentive to reduce the amount of

platform-specific code. Ideally all development would be devoted to creating one piece of software that ran on a variety of different operating systems. It isn't usually realistic to make 100% of the code platform-independent, but communities will move in this direction. One example of this is Mozilla's creation of XUL (the XML-based User Interface Language). When Netscape first opened its browser code, the front-end was built with platform-specific code. Making one change meant making that same change up to a dozen different times. XUL fixed that situation by moving all front-end code into an XML format that let a developer make one change that would work across all platforms.

Why do people continue to pay \$350 dollars for Microsoft Office when they can get OpenOffice for free? The power of the Microsoft brand and reach? The lack of OpenOffice education? Is Microsoft Office superior? Uncertainty with the interoperability of the files?

Marten Mickos: Brand is key. Interoperability is another major reason (or, more specifically, the perception of differences in interoperability). Generally speaking, to break into an old market with a new product, it's not enough to have a slightly superior product. You need some vastly compelling reasons for the customer to switch (such as a new business model, new pricing, faster performance, etc.).

Andy Astor: Individuals have no motivation to switch. Most of us work for corporations that standardized on Windows and Microsoft Office. So, until CIOs demand that all applications default to Open Source (five years from now), Microsoft Office will prevail – but not forever.

David Boswell: I think it's a combination of many reasons. People are familiar with Office and are reluctant to change and many people haven't even heard of OpenOffice. You could also add distribution to this list. Most consumers probably get Microsoft Office when they buy their computer and the extra cost of the software is less noticeable than if they were buying Office separately. If Dell offered a configuration option to have OpenOffice installed on your computer for \$5 instead of paying for Office, I bet a lot of people would give it a try. ○

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Dealing with Open Source Licensing

There are ways to find out what's in your code

By Philip Peake

Much as some people would like to paint Open Source licensing as a viral disease that can cause untold problems for innocent software companies, the truth is a lot less dramatic.

Not a New Problem

Having to deal with “foreign” code under specific and sometimes restrictive licensing conditions isn't a new problem, nor is it confined to Open Source code. Many commercial software products contain code written not only by the companies selling those products but by other companies whose code components are licensed under different conditions.

The conditions for using third-party code have been different than for code licensed under the GPL. In fact, they are almost the opposite. Traditionally it has meant safeguarding the licensed code from disclosure, using it only for specifically licensed purposes, and paying the appropriate fees. Open Source licenses, on the other hand, typically require that the code be made available, letting it be used for just about anything with no fees attached to its use. There may, of course, be other conditions attached to its use such as requiring that notice be given that it's included in a product, along with a copy of the license, or that the whole product adopt the same licensing terms.

Actually these are just a new set of license terms, and a price that a commercial software company has to evaluate as it would any other conditions. The decision to adopt the code or not is based on usual value for money and the commercial advantage of using proven, available code versus developing and maintaining yourself.

What's New

What's new is that Open Source code is freely and widely available and much more likely to find its way into a commercial product “accidentally” than conventionally licensed third-party code. This can happen in any of a hundred ways from an unthinking employee seeing “free” code and simply incorporating it in his project to an employee or contractor behind schedule deliberately incorporating it.

Of course, when any reputable software company discovers such a thing, it will take steps to correct it. However, correcting the situation may not be trivial. Assuming that GPL code has been “inadvertently” incorporated, there are essentially three ways of dealing with the problem:

1. Approach the author(s) of the code, explain what has happened, and ask them to re-license the code under an agreeable set of conditions for an agreed-upon fee. Given goodwill on both sides, this might be an acceptable solution. However, the code could be owned by too many people to deal with, or one of them may not want to license it under any other terms than those already established.
2. Rewrite the functionality of the code in question and replace the Open Source code. The problem here is that this takes time to do. And during this time the company is in breach of the Open Source copyright. The Free Software Foundation usually takes a relaxed view when a company shows a willingness to correct the breach, but corporate lawyers are generally averse to spending any more time in a compromising situation than they have to. Developing, testing, and distributing a modified product (along with recalling the dicey one) can be expensive and for that reason not feasible.
3. Re-license the whole product under the GPL. This is in certain quarters the source of the “viral GPL” claim that gets so much coverage. This may actually be a viable alternative in some cases, but in most it's probably not – either because it could potentially damage the business model that the product is based on or because there are other components in the product whose licenses would be violated by the GPL. Of course, these same problems and solutions exist if commercially licensed code, meant to go into one product, finds its way into another. It's not a situation a company wants to be in wherever the illegitimately used code comes from. The only difference when Open Source code is involved is that



About the Author

Philip Peake is a member of OSDL and coordinates the Desktop Linux Working Group, which was the author of the DTL 1.0 document. Philip has over 25 years of experience with Unix systems, applications, and Internet consulting. Before joining OSDL, Philip worked for a number of companies including Sun Microsystems, AOL, Netscape, and Perot Systems. Philip has a BS in computer science from the University of Keele.
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it's more likely to be noticed and there's the possibility of a potentially unpalatable remedy – open sourcing all the product code.

Mainly a Big Company Problem

Managing third-party software components is generally only a problem for mid-sized and large companies. Smaller companies have smaller development teams that are typically aware of what each member of the team is doing, and are all generally aware of the existence of third-party code and the rules surrounding its use. In larger organizations more formal policies, procedures, and processes are generally required.

Usually these policies have focused on limiting access to the licensed code, which used to be a pretty good device. But Open Source code is freely available; traditional management policies can't deal with this.

So some companies have tried strictly enforcing a rule forbidding any Open Source code to be imported into their internal networks. This has two disadvantages. First, it shuts a company off from any the commercial benefits of using some Open Source code and products in a controlled way, which competitors may not be doing. And second, although it's relatively easy to contain a small amount

of third-party code, it's hard to seal out an outside world that's awash in freely available Open Source code.

A Business Opportunity

Of course, one man's problem is another man's business opportunity, and this is a big enough problem dogging enough companies with deep pockets to attract a solution.

Perhaps the best-known solutions come from Black Duck Software (www.blackduck-software.com) and Palamida (www.palamida.com).

Basically, they both take all the free software they can lay their hands on, and break it up into normalized logical units, calculate a signature (such as an MD5 checksum), and store in a database.


A customer anxious to verify that his latest product doesn't contain any unsuspected Open Source components then checks his source code against the Black Duck or Palamida databases for any matches.

As you might imagine, the key to the success of these system is in the algorithms and heuristics used to do the code normalization and determine the logical unit boundaries from which to calculate the signatures.

Both companies have created complete compliance management systems around this core technology. They are easily extensible to third-party code fragments. They can be processed to produce customer-specific databases to check against, so a final compliance verification of a product's source code can list what third-party and Open Source code is in it and list the relevant licenses so all of the license terms are both compatible and complied with before the product ships to a paying customer.

In many ways, the growing prevalence of Open Source software and its licenses has done the software industry a favor in forcing it to face up to the issue of IP management and give it the due diligence it deserves, but often lacked in the past.

Any self-respecting software development organization should be able to determine the origin of all the code used in a project, and product management should understand the licensing terms of each component and how they affect the final product.

If this can be done in the organized chaos of the Linux kernel development certainly it's not too much to ask of any "professional" software development organization? 

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There is no escaping the penetration of Linux into the corporate world. Traditional models are being turned on their head as the open-for-everyone Linux bandwagon rolls forward. Linux is an operating system that is traditionally held in the highest esteem by the hardcore or geek developers of the world. With its roots firmly seeded in the open-source model, Linux is very much born from the "if it's broke, then fix it yourself" attitude.

Major corporations including IBM, Oracle, Sun, and Dell have all committed significant resources and money to ensure their strategy for the future involves Linux. Linux has arrived at the boardroom.

Yet until now, no title has existed that explicitly addresses this new hunger for information from the corporate arena. *LinuxWorld Magazine* is aimed squarely at providing this group with the knowledge and background necessary to make decisions to utilize the Linux operating system.

Look for all the strategic information required to better inform the community on how powerful an alternative Linux can be. *LinuxWorld Magazine* does not feature low-level code snippets but focuses instead on the higher logistical level, providing advice on hardware, to software, through to the recruiting of trained personnel required to successfully deploy a Linux-based solution. Each month presents a different focus, allowing a detailed analysis of all the components that make up the greater Linux landscape.

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Open Source Telephony Answers the Call

Innovation is key

By Rick Segrest

Open source telephony will play a key role in keeping North American companies competitive in today's global marketplace. Not only does open source reduce upfront and operational costs, it increases productivity and furthers innovation in ways proprietary technologies cannot.

Take Aheeva as an example. Montreal-based Aheeva, a developer of call center applications, considered launching a spin-off company that would provide contact center outsourcing services including technical support, sales, and newspaper and cable TV subscriptions services.

However, at first glance it seemed too expensive since the start-up cost of setting up a call center (based on a proprietary PBX solution) would have cost close to \$2 million.

In addition, many companies find that once an expensive standard PBX solution is implemented, it's not customizable, does not provide the level of support needed, and there is often little they could do to improve it.

Drawing from their vast expertise in evaluating and recommending call center technologies, Aheeva was in a position to compare solutions and implement a best-of-breed solution for its spin-off, the Atelka call center.

In March of 2003, they discovered Asterisk, the open source PBX/telephony application for Linux. Aheeva began as a three-man consulting service, with no call center. Working with high-end, very expensive, proprietary, hardware-based Lucent Genesis PBXs, they struggled to find contracts where they could deliver a fast return on investment.

By September 2003, six months after they discovered Asterisk, Aheeva dramatically increased the number of contracts they were able to pursue and win. Their new list of happy customers received the benefit of a reliable technology and a huge cost savings that Aheeva was able to pass along to them. Aheeva now continues to grow its consulting arm, adding 25 new employees including 15 engineers. Furthermore, they were now able to create the Atelka call center, which provided a new line of revenue for the company. By September 2005, Atelka will exceed 500 call center employees providing a wide range of services.

"We immediately saw the potential in the Asterisk solution," says Georges Karam, CEO of Aheeva. "We adopted Asterisk and got to know it very well."

Many companies now need call centers that can handle a high volume of calls for their technical support or sales department. Asterisk already has the functionality needed for this application built in: call queues, parking, extension logic, contexts, etc. "Call centers can benefit extensively from Asterisk-based call center solutions," says Karam.

Another key value-add for Aheeva was Asterisk's customizability. Aheeva was able to create several specialized tools to complement existing features and increase their contact centers' productivity.

Aheeva needed to simplify the configuration and administration of the existing Asterisk dial plan (Asterisk normally uses text-based configuration files to handle this). In addition, Aheeva needed to expand the ability of Asterisk to handle load balancing over an array of multiple Asterisk servers and switches, without losing track of the channel in which each individual call resides. This improved Asterisk's quick deployment and scalability.

AGI, or Asterisk Gateway Interface, is patterned after the Web's Common Gateway Interface so that the programmer can use his or her favorite programming language to create Asterisk applications, then communicate with Asterisk through STDOUT, receiving Asterisk's response through STDIN.

In the process of adding new features to Asterisk and testing its limits at the time, Aheeva discovered and fixed two bugs within the Asterisk code that appeared when you scale it to installations of this size. The Aheeva team submitted patches back to the community, which were well received. The stable branch of Asterisk 1.0 was introduced back in September 2004.

Though Asterisk started out as a basic PBX in 1999, it has expanded, integrating all of the major features needed in any type of telephone network for businesses. Because Asterisk has provided Aheeva with a high level of quality, as well as the ability to customize and upgrade inexpensively, it has enabled the company to compete with both the quality of big telecom companies, 



About the Author

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Open Source IP Communications

Setting a cat among the canaries

By Al Brisard

In a small or medium-sized business, the cost of telephone equipment, phone lines, and long distance calls can easily reach tens to hundreds of thousands of dollars. A chief executive officer or operations manager

Although attempts to solve business problems with innovative voice-over-IP (VoIP) solutions exist, the final product simply replicates the vendor lock-in model. The freedom to choose between vendors, increasingly the norm since the telecommunications industry was deregulated, has yet to hit the IP telephony market – until now.

Now there's a new Enterprise Communications Model available based on enterprise-grade Open Source software that empowers small-to-medium-sized businesses (SMBs) to decide when and how to use VoIP technologies. They can choose to use an enterprise-grade VoIP solution at any stage of deployment whether it's in conjunction with an existing traditional phone system, an upgrade to another vendor's VoIP system, or a new build; technologies and vendor solutions can be mixed and matched. It's a radically different approach that invites competition and the simplicity of the Open Source model creates obvious cost benefits and value.

sipX, the industry's first Open Source enterprise communications voice services platform, combines the cost savings of voice-over-IP technology with the quality and adaptability of Open Source software created by a community of developers at SIPfoundry (www.sipfoundry.org); it's a solution that can improve a business exponentially. With an Open Source solution, companies no longer have to pay licensing fees for software or premiums for proprietary hardware. They will pay less for licensing and still get the enterprise-grade support they got from traditional vendors, such as software additions, service-level agreements, and training. If the system fails, companies can call to resolve the issue. Guaranteed service contracts will make Open Source the low-risk solution widely adopted in the enterprise.

The Benefits Are Clear and Compelling

Using a voice-over-IP solution, a company can take advantage of the merged benefits of IP telephony. Rather than pay to run two separate voice and data networks, businesses can combine the two. Phone bills become markedly less because voice calls over an IP network are much less expensive compared to calls over the publicly switched telephone network (PSTN). System installation costs are less because packet telephony lets users buy off-the-shelf servers from multiple vendors, rather than proprietary Private Branch Exchanges (PBX). Yet, despite these benefits, today's vertically integrated IP telephony market has prevented the wide adoption of voice-over-IP solutions and has locked companies into proprietary systems. Combining a voice-over-IP solution with an Open Source business model solves this problem while multiplying the benefits of IP telephony technology.

Voice-over-IP

While a lot of voice traffic is still carried over dedicated voice circuits on a Public Switched Telephone Network (PSTN), enterprises have started migrating their voice communications from TDM networks to packet-based networks. VoIP provides two-way transmission of voice/audio over a packet-switched IP network and because IP networks are so ubiquitous, VoIP represents a natural evolutionary step as voice, video, and data converge onto a single network.

VoIP offers a number of advantages over conventional enterprise phone systems. Companies can use it to cut their voice and fax costs by eliminating traditional long-distance toll charges or 800-number costs. VoIP technology can also be used to integrate voice and data networks onto one IP-based infrastructure that supports data, voice, and video. This minimizes capital investment in equipment and cabling and reduces the cost of installation, maintenance, reconfiguration, and administration. Using a single set of IP access



About the Author

Al Brisard is vice-president of marketing at Pingtel Corp. where he oversees product development, strategy, and marketing programs. Prior to Pingtel, Al led the development and execution of MCK's product strategy, expanding the development of its remote voice products over broadband networks. He was also director of marketing and business development at 3Com's Personal Communications Division. He has an MBA from Boston College Carroll School of Management and a BS in electrical engineering from Northeastern University.

lines for both voice and data can also reduce network access costs.

While VoIP's benefits are significant, current solutions for small- to medium-sized businesses duplicate the old proprietary PBX model. So despite the benefits, SMEs find themselves locked into a single-vendor solution, paying to license software, and trapped by whatever equipment, pricing, and patches the vendor issues. To address this problem, an Open Source solution is needed.

Open Source

The key to preventing vendor lock-in and creating an affordable interoperable voice-over-IP solution is to open up the source code to a larger community of developers. Many eyes bring greater stability and more functionality. An Open Source solution lets companies run voice-over-IP communications software on off-the-shelf Linux servers and use equipment from multiple vendors; it's a solution that fosters competition. It's also a solution that chief information officers (CIOs) and even the government support.

With an Open Source VoIP solution, a small to medium-sized business gets the software for free (no licensing fees) and IP/TDM gateway equipment from multiple vendors. Rather than requiring proprietary phones, the Open Source solution uses standards-based ones. The business owner only pays for professional services and a support subscription. It's a dramatically lower-cost solution than any of the proprietary systems on the market. It mirrors the way costs in the PC market dropped dramatically as components became commodities. A vertically integrated market denies telephony customers PC-like economics and multi-vendor solutions.

The Open Source model isn't new; in fact, it's picked up a lot of momentum in the past few years. Linux and Apache have gained significant market share. Most Web traffic today travels over servers that run Open Source software. Large enterprises are using Open Source databases to break vendor lock-in and cut costs; so much so that the spread of Open Source software threatens all of the commercial database providers. The Associated Press, Saber, and Cox Communications, Inc. are all using Open Source software from MySQL AB of Sweden. Massachusetts administration and finance secretary Eric Kriss has instructed the state's technology officer to adopt a policy of Open Source and open standards for all future spending on information technology. Even IT directors at the Pentagon have said that Open

	Proprietary VoIP Solution	Open Source VoIP Solution
Hardware	PBX applications run on customer (or OEM) hardware/servers or are tied to vendor-specific routers and switches	Communications software runs on off-the-shelf Linux servers and uses IP/TDM gateways from multiple vendors, driving down the cost of hardware.
Software	PBX applications remain proprietary and costly.	Communications software in an Open Source model becomes virtually free.
Service	An enterprise pays for service and maintenance on a product that often needs many fixes. An enterprise with questions must navigate through the labyrinth help desk, often waiting days or weeks to get an answer.	An enterprise pays for a lower-cost subscription service that covers help and maintenance on a stable product. It can speak directly to the developer, getting answers quickly.
Phones	Proprietary phones are sold at a premium to a captive audience.	Standards-based phones in many varieties become cost-effective because of competition.
Technology	Innovation is stifled by proprietary systems and protocols; vendor lock-in drives lack of interoperability and slows delivery of new features	Open Source code base and the SIP standard foster rapid innovation and assure interoperability
Market	Mature market with established players (about 4% CAGR)	New options for customers; new opportunities for many different vendors.

Table 1:

Source software is cheaper and more secure than proprietary software. Cap Gemini Ernst & Young in France has been using Open Source for 15 years.

Apple, HP, IBM, Oracle, and SAP are all using Open Source software too. They have invested heavily in Linux and the Apache Web server and are using off-the-shelf hardware.

Why has Open Source become important in the voice-over-IP market? Because buyers and the vendors that support the IP phone systems need an alternative to the proprietary software and hardware that locks companies into vertically integrated solutions.

For a comparison of proprietary versus open source solution, see Table 1.

Proprietary VoIP Solution Open Source VoIP Solution

Building an Open VoIP Solution

An Open Source business model in the IP telephony market will be a fundamentally disruptive force in the \$5 billion-a-year Enter-

prise PBX market. This model combines the best attributes of Open Source development, including low cost, adaptability, and flexibility with the reliability and support that enterprises require for voice. Like enterprise-grade Linux, this approach will drive the commoditization of traditional telephony hardware and software, eliminating the technology lock-in that has plagued the industry for decades. This new business model be adopted pervasively and shift market share away from vertically integrated, proprietary competitors.

Enterprise communications will break out of the proprietary "black box" domain and move into the IT department, cutting costs and improving performance. Open Source voice-over-IP is poised to turn the Internet telephony market on its head.

Some VoIP solutions that exist today try to solve the interoperability problem using the Session Initiation Protocol (SIP). SIP, a protocol created to standardize the setup of IP calls, multimedia conferencing, and other Internet

communications, was designed to standardize VoIP technology and create vendor interoperability. While it's been successful in creating industry standards, in practice the market has been stymied by the way the protocol has been used. The standard has been "polluted" by vendors adding their own proprietary features to their implementations of the protocol.

Establishing a truly standards-based dominant solution in the market requires a broadly accepted technology and a business model that leads to pervasive adoption. In the telephony market, this means combining two parallel worlds – voice-over-IP and Open Source. VoIP solutions were created to benefit enterprises, allowing businesses to take advantage of the cost savings and the scalability of voice integration over data networks, cutting long distance charges and eliminating the

fied messaging, and an auto-attendant. With the significant enhancements in the latest release, sipX is even easier to download, install, and manage. This robust SIP PBX for Linux is fully interoperable with SIP-compliant media gateways and phones, and fully manageable via a simple and powerful Web browser graphical user interface (GUI).

- **SIPfoundry Carrier Applications** repro is a SIP proxy server and registrar built on the successful field-proven reSIProcate SIP stack targeted at telecommunications carriers. repro was designed to eventually support millions of users and easily integrated into, and managed by, existing carrier back-office systems. repro includes implementations of new advanced security features developed in the IETF. These security features include TLS, distribution

stack, is a high-performance, efficient, and extremely up-to-date SIP stack with excellent support for advanced security features and additional transport protocols. It has been commercially deployed in a diverse set of applications such as softphones, session border controllers, and call centre software by innovative companies like TelTel, Jasomi Networks, Xten, Telio, and ComputerTalk on Windows, Linux, and Mac OS X platforms. sipXtapi is a high-level SIP user agent and SDK with a powerful and simple API that encompasses call processing, audio processing, SIP dialog management, and SIP stack functionality for Linux and Windows environments. With sipXtapi, application developers can create SIP-based clients, without understanding the details of SIP.

Companies and individual developers who want to help reshape the VoIP market in a new and open structure can learn more about contributing at www.SIPfoundry.org.

“ Open Source voice-over-IP is poised to turn the Internet telephony market on its head ”

need to run separate networks for voice and data. At the same time, Open Source is at the heart of a business revolution. Major enterprises are running mission-critical functions on Open Source software and big vendors such as IBM and Oracle have lined up to support it. Linux, Apache, Tomcat, and Java are just a few of the Open Source software solutions corporations are using today.

SIPfoundry, a non-profit organization, is the leading Open Source SIP community development project (www.sipfoundry.org). Its mission is to promote and advance SIP-related Open Source projects and establish a mechanism for users, developers, and distributors of those projects to contribute to the adoption of SIP. SIPfoundry provides solutions that address real problems faced by enterprise customers and telecommunications carriers that want to deploy standards-based communications products such as:

- **SIPfoundry Enterprise Applications** sipX, the SIP PBX for Linux, is a 100% SIP, 100% Open Source PBX with the functionality required to meet today's business requirements. Intended for end users, OEMs, and developers, sipX is a complete, fully documented SIP PBX with voicemail, uni-
- of certificates using the SIP certificate and credentials event packages, and the SIP Identity header. The alpha version of repro is available now for download, with the source code and all the software necessary for users to compile and begin working with this new Open Source SIP proxy server.
- **SIPfoundry Applications for End Users** SIPfoundry has two primary client solutions – sipXphone and sipXezPhone. Both projects are SIP-based applications that give end users the ability to extend the value of their computing platforms by enabling voice and presence-based communications. sipXphone and sipXezPhone are both end-user applications with easy-to-use graphical user interfaces (GUIs) that make installation and use simple and straightforward. These projects enable both Windows and Linux users to benefit from the economic advantages offered by Open Source development and the flexibility and interoperability options delivered with standards-based SIP-user agents.
- **SIPfoundry OEM and Developer Solutions** For OEMs that require SIP solutions for their products SIPfoundry offers reSIProcate and sipXtapi. reSIProcate, the definitive C++ SIP

Open Source VoIP... SIP

Today vertically integrated solution suppliers deny customers PC-like economics and multi-vendor solutions. The market's entrenched players have no incentive to change their current business model, leaving customers hostage to proprietary single-vendor solutions with few alternatives. The move to Open Source voice-over-IP will encourage true interoperability between products, leaving behind the closed proprietary world of voice communications.

Fundamentally, this move will force the telephony market to re-examine the current model of vertically integrated single-vendor solutions and move to the more open model typical of the IT.

In today's environment, business owners and IT managers are looking for a higher level of service on reduced budgets. To do more with less, they can now consider an Open Source alternative to legacy PBX solutions or proprietary VoIP solutions. And because it's Open Source, SIP will evolve into a broader communications platform that supports presence, IM, video, and collaboration. SIP is the foundation where communications will converge and become truly pluggable.

The Open Source model is built on the premise of letting the best technology win in an open competitive environment. But in making telephony decisions, CEOs and IT managers haven't had the option of choosing an Open Source, low-cost, high-quality voice-over-IP solution - until now. ○

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