



OPEN SOURCE AND HEALTHCARE IT

In 1999, the Institute of Medicine published a seminal study showing that as many as 98,000 Americans die each year from medical errors. Why do these errors occur? Inevitably, they are a consequence of modern-day medicine where skilled specialists such as nurses, physicians, pharmacists, and lab technicians must work in concert to provide the best possible care. This fast-paced orchestration demands that the right information is given to the right person at the right time. Otherwise, errors are inevitable.

In the past decade, a single provider system of over 160 hospitals that treats 25 million patients annually has climbed to the number one ranking of numerous studies on a broad array of metrics covering quality of care and other performance measures. Thanks to a sophisticated healthcare information system and electronic medical record, this system has virtually eliminated entire classes of medical errors, improved efficiency by reducing paperwork for care practitioners, and enabled the detailed analysis of the efficacy of specific treatments across a broad patient population. This system is the Veterans Health Administration, and the healthcare information system is the open source software known as VistA.

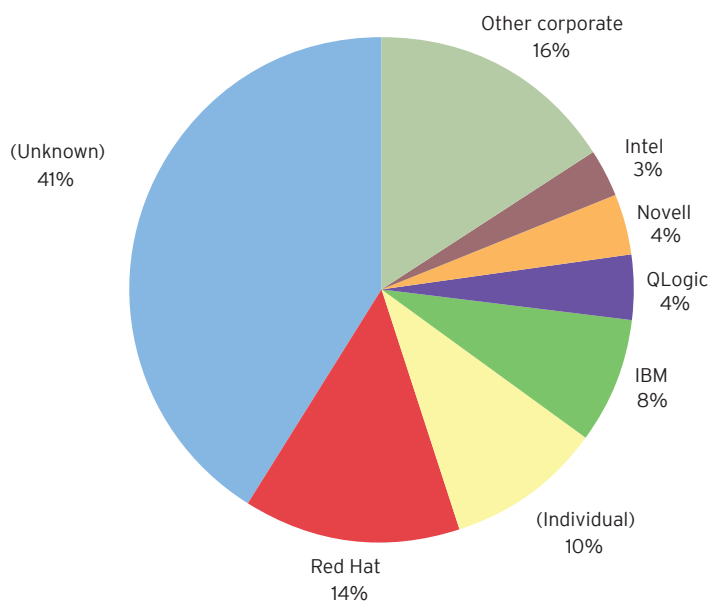
Open source is a software development methodology and philosophy characterized by freely redistributable source code, which is traditionally a closely guarded trade secret of proprietary software companies. Open source software turns this model inside out and encourages the free sharing of software blueprints. This sharing empowers a robust ecosystem of contributors who collaborate in advancing the development of software.

The hallmark of a successful open source software project, this collaborative ecosystem enables all users of the software to amortize their development costs and share knowledge across a larger install base than that of traditional proprietary software. Customers, partners, and competitors alike can all contribute and benefit from participating in the community.



One consequence of this cooperative approach to software development is that no single software vendor is capable of dominating a truly successful open source project. Below is an analysis performed by lwn.net in February 2007 of the number of code commits to the Linux kernel over a one year time period, comprising over two million lines of new code added to the kernel. Despite the fact that Red Hat is the primary organization contributing to the Linux kernel, its total contributions still place it in the minority. The dominant contributors to the Linux kernel are organizations and individuals whose contributions are too small to measure at this macro level. Proprietary organizations, in contrast, must invest in developing the entire software product themselves, and consequently pass those costs directly on to their customers.

Linux Kernel Contributions, 2.6.16 - 2.6.20



Besides the dramatic economic advantage, open source has a number of other benefits. Open source software inherently provides users with more choice around service and support of the software. Users can choose to adopt and deploy open source software on their own, or select between competing vendors. Since the intellectual property of open source software belongs to the community, no one organization can have a monopoly on the software, and vendors must continuously compete on service and support. If the service or support provided does not provide sufficient value, the user always has a choice to simply support it themselves or go to an alternative vendor.



Another unique advantage of open source is the level of public scrutiny that source code undergoes prior to its inclusion in a major software release. Similar to the practice of peer review in academic circles, the open publication of all source code, coupled with a community of reviewers, testers, and users, drives software quality in open source software.

Unsurprisingly, over the past two decades, open source software, such as the Linux operating system, the Apache web server, the Firefox web browser, the JBoss application server, and the BIND domain name server, have come to represent significant portions of their respective markets. In each case, the same confluence of factors—shrinking IT budgets, expansion of Internet connectivity and email, clearly defined technical problems that demanded robust solutions, frustration with proprietary solutions—led to the rapid adoption of open source software into the mainstream.

These factors have also led to the accelerated adoption of the open source model for software development in life sciences in the past few years. For example, Bioconductor, TM4, and BioArray Software Environment (BASE) are all open source software tools that are widely used to analyze DNA microarray assay data today. The availability of source code enables users to understand and enhance the algorithms used for data analysis while simultaneously providing a flexible platform for additional innovation.

In the healthcare space, a large number of projects have been launched to address all areas of healthcare IT, ranging from full-fledged healthcare information systems such as Vista to tools for healthcare interoperability. Over time, these projects will undergo a process of natural selection, and those with strong communities, great technology, and open leadership will prevail.

Tools to facilitate the sharing of clinical data are a more recent development in open source healthcare IT. Healthcare data and interoperability standards, including HL7, CCHIT, and IHE, have all been growing in importance and maturity. Similarly to how standards like HTML, HTTP, and DNS led to the development and adoption of open source software, a number of open source software communities have started building tools to implement these healthcare standards. The Mirth project provides an open source interface engine that can route and transform HL7, NCPDP, and other message formats. The Eclipse Open Healthcare Framework provides a framework for IHE interoperability and has been adopted by a number of open source and commercial software products.



Traditional software vendors have taken note of the benefits of open source as well. Notable among these vendors is McKesson, one of the world's leading companies in providing healthcare information systems. McKesson has embraced open source as a way to provide affordable, reliable computing for their customers, using Red Hat Enterprise Linux, JBoss, and other open source technologies as key components of their Horizon Architecture platform. Moreover, McKesson's research and development groups are active participants in the open source process, contributing valuable real-world feedback and code to various open source projects.

What does all this mean for healthcare IT decision makers today? Open source software is part of the mainstream and should receive due consideration in any deployment. Evaluating open source software side-by-side with proprietary alternatives on functionality, scalability, reliability, and so forth is the first step. At the same time, there are unique advantages to open source software that should be considered in any decision. The flexibility of being able to adapt to specific needs, the freedom of being able to choose between open source software suppliers (including your internal organization), and the lack of proprietary license fees are all advantages of open source software.

Fundamentally, open source is about creating a collaborative environment for problem solving. As healthcare technology standards evolve and healthcare IT systems adopt standards-based software technologies that enable greater interoperability, the opportunities for healthcare IT collaboration will only grow. The compelling economics of open source and its collaborative development model will continue to improve the affordability of these complex healthcare information systems that are crucial to improving the quality of patient care.