Articles

Open Source, Open Standards

Free license software is becoming more popular for the general public and military training applications—and companies—could benefit from adopting free license software.

By Frank Boosman

In recent years, the popularity of open source software—software in which the source code is available under one of a variety of free licenses—has grown dramatically, to the point where it underlies our daily existence.

For example, when we check e-mail, more often than not, we retrieve our messages from open source e-mail servers, running on open source operating systems. When we visit Web sites, those Web sites are, more often than not, built on open source Web servers, with the Web pages passing through routers running open source software on their way to our desktops.

Open source software has become popular for many reasons, both quantitative (it costs less than proprietary alternatives) and qualitative (it encourages innovation). One important qualitative reason for the success of open source software is the popular belief—a correct belief, in this author's opinion—that it protects adopters from many of the disadvantages of proprietary, single source solutions. Even for a firm that may never need to modify the source code of a product it uses, the knowledge that it could do so if necessary is a significant reduction in risk.

From the standpoint of a software vendor, this is an extremely important point: open source software increases customer confidence. When customers know that their technology acquisitions are based on proven open source solutions, and when they know that they will never be required to go back to the original vendor for modifications—though they may well choose to do so—it removes a barrier to purchase and makes them more likely to buy.

This is part of the answer to a question that dogged the open source community in its early days: how can businesses make money and grow by selling something that's free? The answer is that they don't. They make money by adding value to what is already available for

free, and they grow by making it easier for customers to make purchase decisions.

The Danger of Lock-In

Historically, defense contractors building software have, on occasion, done their best to lock in military customers, making it difficult or impossible for their customers to maintain or enhance software without going back to the original contractor.

Presumably, contractors who have pursued such strategies have done so because they felt that making it easy for the customer to modify their work would reduce their future business prospects.

I have listened to government customers complain about proprietary legacy software systems for training and analysis. "We have to go back to the original vendor for even the slightest change," they say. "It's expensive and it takes too long. There has to be a better way."

In fact, there is a better way: open source software, which is not only better for military customers, but for military training vendors, as well. By removing the fear of proprietary lock-in, a significant barrier to purchase, open source software makes it easier for military customers to commit to new software-based training projects.

If open source software makes purchasing decisions easier, is the corollary true? Does lock-in make purchasing decisions more difficult? I believe that ultimately it does. In other words, as a strategy, lock-in is ultimately self-defeating. It may work in the short term, but over the long term, lock-in discourages purchases and reduces business opportunities for training vendors.

Military Open Source Adoption

Recognizing much of the above, military organizations around the world are already adopting open source software, or authorizing and encouraging such adoption:

- The U.S. Department of Defense has authorized the use of open source software since 2003.
- The U.S. Navy has launched a three-year program with the Open Source Software Institute to increase its use of open source software, focusing on applications within the Naval Oceanographic Office's Web services, scientific computing and enterprise architecture systems.
- The Canadian Department of National Defence and the Canadian Forces have called open source software "a viable cost-saving opportunity" and said it offers "concrete opportunities for ... technology insertion and flexibility."

- Indian President A. P. J. Abdul Kalam has called for his country's military to use non-proprietary technology, asking defense engineers to develop and implement on open platforms.

Open Source and Confidentiality
A common mistake is to assume that open source licenses require the release of any code or resulting product built using open source software. This is often untrue.

GNU—an acronym for GNU's not UNIX—started in the late 1980s to produce a free version of UNIX. The GNU Project's general public license (GPL) requires that when modifying source code licensed under the GPL, any and all modifications to that source code must be made available freely under the same GPL.

This is obviously unacceptable for military software projects in which the source code could be considered sensitive from a security standpoint—though it does not preclude the use of such code for any military project. The popular open source operating system Linux uses the GPL and yet is in use today within the U.S. military as an operating system for a variety of uses. This is not only acceptable, but even desirable, given the well-documented suitability of Linux for many tasks. But building a sensitive military computing system that requires modifications to the Linux source code would be impossible.

However, the very popular FreeBSD (Berkeley Software Design) Foundation's FreeBSD license merely allows the redistribution of modified code, as long as certain conditions are met. In other words, modifying source code licensed using FreeBSD and delivering a product based on that modified source code does not obligate the modifier or the customer to release either the source code or the resulting product.

Croquet, a new operating system being developed from the ground up specifically to enable collaborative visual applications, is licensed under FreeBSD-style terms. They allow interested parties to make any desired modifications to it, to deliver commercial products based upon those modifications, and to decide on a case-by-case basis when to share those modifications with the world at large. Other similarly flexible open source licenses exist as well.

Open Standards
As open source software has become pervasive, open standards—non-proprietary standards for data representation and interchange—have become ubiquitous and universal. The Internet and the Web literally would not function without the open standards upon which they are based, such as HTML, TCP/IP, and many others.

The simulation learning community has a strong track record of creating and adopting open standards for content creation and delivery. These standards include XML (extensible

markup language) for generic data representation, SCORM (Sharable Content Object Reference Model) for the sharing of learning objects, S1000D for technical publications, U3D (universal 3-D) for 3-D data repurposing and others.

Much work beyond these standards is needed, however, to address the needs of the fast-growing simulation learning community and military organizations. The time has come for the simulation learning industry and its customers to take the next step and reap the benefits of open standards and open source software. To take this step, military organizations need to require three things of their vendors:

- All content generated on learning projects must be delivered in formats based upon open standards. This does not preclude innovation, adaptation and flexibility—far from it. For example, XML can be used for lesson and scenario definition files. It has been also used to create a variety of schema—basically data templates—that are geared toward the needs of specific projects.

- When pre-existing software is required for a project, whenever possible, open source software should be used. This does not preclude the use of proprietary COTS software. In many cases, proprietary COTS software is the best possible solution to a given problem. Again, it is not difficult to use a mixture of tools drawn from COTS and internally developed software. For a customer to require or for a vendor to suggest that sub-standard software be used solely on the basis of its licensing terms would be a disservice to those who will use the resulting product. But where open source software alternatives exist, and where such alternatives match or exceed the functionality of proprietary COTS software, the choice should be clear.

- Any software developed for a project should be released under an open source software license, preferably that of FreeBSD or a similar license. This ensures not only that the customer will have ongoing access to the code, but that other customers and vendors alike will also have such access.

The active and enthusiastic participation of military customers of simulation learning software will be required to bring about these changes. These customers must begin to require that vendors use open source software where practical and require their vendors explain thoroughly when it is not used.

Most importantly, military customers must require that vendors release all code developed using government funds under an open source software license. This may be the most difficult change to engender, because as a customer, it is easy to say, “I paid for it, so I should own it exclusively.” This can be a tempting thought, but it is counter-productive. As more and more military customers release code for their projects under open source licenses, the availability of such code will create a network effect, amplifying the efforts of all vendors by allowing them to build on what already exists. As has been so amply demonstrated in the civilian open source community, this will lead to better products at lower prices.

As a growing number of organizations require the use and development of open source software by vendors, the military simulation learning community will create an ever-growing body of tools and technologies, available for all to build upon, fueling ever-faster growth in capabilities and applications.

As Netscape founder Marc Andreessen noted, "Open source means standing on the shoulders of giants." By standing on each other's shoulders, we, the vendors of simulation learning solutions for military applications, will be able to lift ourselves higher and to do so faster than ever before.

Editor's note: Frank Boosman is the co-founder and chief marketing officer of 3Dsolve. This article was adapted from a presentation he gave during TESI 2005 held in Maastricht, Netherlands.