

## Office of Technology Strategies (TS), Architecture, Strategy & Design (ASD)

### A VA Executive's Guide to Open Source Development

#### INTRODUCTION

This TS Note will tackle the fairly broad – and strategically important – topic of open source software and development. VA's IT strategy over the next decade will rely heavily on adoption of open source frameworks to meet evolving technology needs as the agency serves Veterans as well as to meet tighter IT budgets across the board. Although open source is already a key focus of development in VA's Veterans Health Information System and Technology Architecture (Vista), this note will step back and review the concept as well as some key tools that exist beside or outside health applications.

#### BACKGROUND

##### *Open and Closed*

The software programs your computer runs usually start out as source code, which is written in plain text and is human-readable. In order for the computer to execute or run the source code, it must be compiled or transformed into code the machine can read. Once it is

compiled, the source code becomes essentially invisible and unalterable. Historically, this closed model has allowed software companies to create proprietary products which other developers cannot copy, thereby setting them apart from other software on the marketplace. The software is bound by a license that prohibits users from a variety of actions such as re-selling or copying the software.

While this is an obvious advantage to the producer of such software, consumers and even developers are often forced to use or pay for software that doesn't meet all their requirements or run well with other programs and operating systems. In some cases, proprietary software actually inhibits innovations and changes in software implemented in fast-changing environments or designed to enhance productivity.

Open source refers to software that provides its source code freely to anyone to study, modify or even incorporate into other software programs. Open source

Defining OI&T's  
"To Be"  
Technology  
Vision



This newly established office within OI&T's Architecture, Strategy & Design (ASD) interacts not only with the ASD pillar offices, but also with multiple stakeholders within OI&T and with strategic offices across the enterprise. TS works closely with IT and business owners to capture business rules and provide technical guidance as it relates to Data Sharing across the enterprise, specifically for inter-agency operability.

software also includes the compiled, executable version as initially programmed by the original developer. While closed or proprietary software licenses restrict copying, distributing and modifying of software, open source licensing ensures there are little to no restrictions on how users interact with the software or its source code. The restricted aspect of such licenses actually prohibits developers from closing source code or software. For example, the GNU General Public License (GPL), the most widely used open source license, legally requires all source code for software under its license be made freely available to users (Figure).

There are also open source certification processes which provide assurances to users that software adheres to open source licensing and uses open standards. This way, one organization's developer can implement changes to a large, multi-adopter system while ensuring it benefits other users or does not limit existing functionality. One example of this is the Open Source Electronic Health Record Alliance's (OSEHRA) certification program, which reviews changes to the Vista codebase and certifies them as open and reusable by all Vista adopters (both within and outside VA).

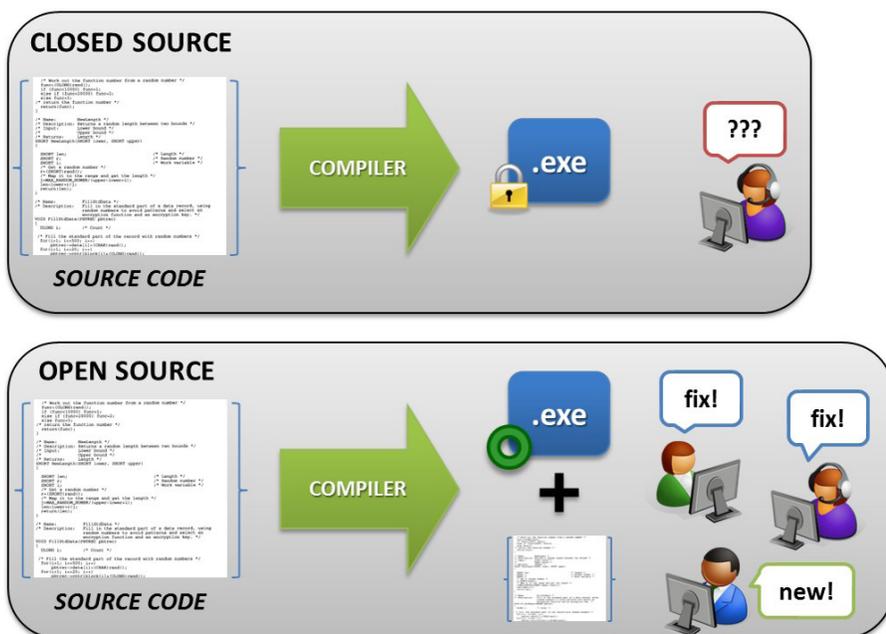


Figure: Closed vs. Open Software

## A VA Executive's Guide to Open Source Development

*Continued from Page 1*

### *Open Source Development*

Open source development relies on the community of users (who have the same “status” as developers) to focus on finding bugs, applying fixes, and increasing functionality of software. In addition to the community, open source development is also defined by a goal to “release early, release often,” which open source advocate Eric S. Raymond popularized in his book *The Cathedral and the Bazaar*. This practice allows developers to catch bugs early in the development process and fix them immediately, instead of waiting for the bug to (potentially) crash the completed code later on.

Projects are also based on smaller components or modules of the larger software code, and changes are integrated into the larger code base on a regular basis (sometimes daily). Ultimately, the purpose of this development cycle is to focus on the community, involving all programmers, testers and users as much as possible, which increases the chance that both the code and the resulting functionality meet the highest expectations.

### *Uses, Benefits and Examples*

Open source is not always suitable for the types of applications used by VA, but many of the business needs of providing health care and benefits to Veterans are common to other communities across the federal and private sector. Utilizing open source software allows these communities to share best practices and deliver functionality that best serves the end-user or patient, and promotes interoperability between partners serving similar populations (e.g., VA and the Department of Defense [DoD]).

### VISTA AND OSEHRA

By 2010, VistA was in use at over 1,000 medical, ambulatory and community outpatient facilities—some of these sites are external to VA and the US. However, VistA requirements, improvements and development were focused only on VA healthcare facilities and relied on proprietary code. Not only was this hampering innovation within the system, it isolated public and private adopters outside VA. As a result, in 2011, VA awarded a contract to OSEHRA to establish and manage a repository of open source code, as well as invite contributions from public and private sectors. Some recent contributions from the open source community include the M-to-M Broker (data exchange between remote VistA M servers) and Medical Domain Web Services (MDWS).

Implementing open source development requires code contributions, smaller initial project scopes and promotion of a level of transparency across the project. Open source software is also a good fit for Agile development methods and environments where user requirements change quickly.

One great example of widely-used open source software is the Mozilla Firefox web browser, which was developed in response to certain criticisms of proprietary Netscape code and features. (Although Firefox is not approved for use by Windows users at VA, it is part of VA's standard Mac OSX build.) On a more technical level, one of the big open source projects is the Linux kernel, which forms the basis of other applications we use on a regular basis such as Android on mobile devices. Other important open source technologies include the programming language Java, Apache products (e.g., Tomcat and Hadoop), and the content-management framework Drupal (used by WhiteHouse.gov)

### OPEN SOURCE AT VA

VistA isn't the only way that VA is focusing on open source. Per the Enterprise Technology Strategic Plan (ETSP), VA's IT vision and strategy for the future includes embracing “applications and programs that take advantage of an open source model which invites innovation from the public and private sectors.” Some key areas where VA plans to make such investments include:

- **Collaboration Software** – Collaboration and productivity tools that leverage open source standards to increase personal and team productivity
- **Development Tools** – Near- and long-term goals to move toward commercial off-the-shelf (COTS) solutions and open source tools as appropriate; support open source development in change and configuration management

Ultimately, open source may not fit all the technology needs at VA, but it will play a role as the agency relies less on legacy and proprietary systems. Investing in open source solutions as well as using open source development within VA will help the agency adapt to changes in how Veterans want to access their benefits and how VA delivers care to meet their needs.

If you have any questions about open source development, don't hesitate to ask TS ([askTS@va.gov](mailto:askTS@va.gov)) for assistance or more information.

Check out earlier TS Note editions [here](#)

([http://www.techstrategies.oit.va.gov/docs\\_ctsnotes.asp](http://www.techstrategies.oit.va.gov/docs_ctsnotes.asp)).