7 Open Source Myths DEBUNKED

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MYTHS & FACTS ABOUT OPEN SOURCE

Executive Summary

The federal government is known for being a lot of things. It's the largest employer in the country, and the largest buyer of goods and services in the world.

Add to that list the largest creator of custom software code.

It's one of those facts you probably don't spend much time thinking about unless you're a technologist or are into coding or conducting market research — but you should. It's big business in government, and it impacts everything we do.

Think of all the websites and online applications and tools you use every day to communicate with colleagues, track projects and serve the public. None of that would be possible without code. The issue in government is that agencies spend billions of dollars on custom-developed software, and more often than not they don't share it with fellow agencies that could benefit from reusing it — let alone the public.

If the code can be shared, agencies don't always do so in a consistent manner. But that's gradually changing, with agencies such as NASA, the Defense Department and the Consumer Financial Protection Bureau leading the movement in government.

A growing number of federal, state and local governments, including the city of Pittsburgh, Oklahoma and even the National Security Agency, are turning to open source software and reaping the benefits of cost savings, collaboration and greater freedom to adapt code as their needs change.

At its core, "**open source software is software developed by and for the user community**," according to the Open Source Initiative, a California-based nonprofit that serves as the steward of the open source definition.

You personally benefit from open source every day and probably don't know it. For example, when you downloaded this resource guide from GovLoop.com, you accessed it from a website built on open source software. If you use the Firefox web browser, you're benefiting from open source.

Per the Federal Source Code Policy issued in August 2016, federal agencies are required to release at least 20 percent of new custom-developed code as open source software for three years. Agencies are still working toward this goal but also viewing open source as a part of a larger plan to modernize IT systems and migrate to the cloud.

Some argue the policy didn't go far enough, while others fear releasing government code will make it vulnerable to attackers.

In this GovLoop guide, we address common myths that can hinder open source adoption, such as sentiments that open source is insecure and unfit for enterprise use. You'll gain insights from government technologists and other experts to help your agency make fact-based decisions about using open source. But before we dive into debunking the myths, let's review the current state of open source adoption in government.

What is Open Source Software?

Open source software is no different from the software you use every day, in terms of the capabilities it provides. Open source software powers citizen-facing websites, cybersecurity tools and a range of other applications you use in your personal and professional life.

What makes it different from other types of software is the way it's developed and the autonomy users have to examine and modify the source code, or the detailed design of the software. There are different licenses that govern how the software can be used.

So when we say open source, we mean a transparent method for developing software that harnesses the power of distributed peer review, as defined by the Open Source Initiative. This transparent process means that users can study, change and improve source code.

In many ways, open source software is similar to something we use in our everyday lives —recipes. Let's say you are the author of a new pie recipe, and you decide to share it with friends at work. You allow your colleagues to use your recipe as long as they give you credit. They are free to make changes as they bake their pies. But any changes that they want you to incorporate in your original recipe must first be cleared by you. The recipe benefits from peer review, and there is an organized way for improving the recipe.

When it comes to software development, there are other nuances that make this process run smoothly, and there are even ways for new software to spin off the original design. To clarify, we get into more specifics about the lifecycle of an open source project later on in the guide.

$6B

The amount federal agencies reportedly spend on software annually through more than 42,000 transactions.

194

The number of shared development projects that the Veterans Affairs Department has conducted with the open source community since January 2016.

2014

The year NASA published the first edition of its software catalog, becoming the first comprehensive listing of publicly available software to be compiled by a federal agency.

How Open Source Benefits Government

What makes open source software such an attractive choice for governments is that it's often the lower-cost option, compared with proprietary software.

Often agencies can build on the open source work that another agency or organization has done, which reduces development time and cost. This means that agencies can more quickly add features to software to meet their needs and then share those changes with other users.

Because the source code is developed in the open and improved by a larger community of people, users can benefit from more frequent updates and wider scrutiny of the quality of the code.

The State of Open Source in Government

You'd be hard-pressed to find a government agency that isn't at least dabbling in open source software (OSS), especially at the federal level.

States such as Oklahoma and New Hampshire have laws on the books that require state agencies to consider open source options when buying new software. New York City Councilman Ben Kallos is trying to pass similar requirements that he and others believe will save the government time and money. But doing so is proving to be an uphill battle because it represents a big shift in the way government buys, uses and shares software.

At the federal level, it took years of bureaucratic hurdling, months of direct engagement with the tech community and thousands of public comments before the government released its first policy in August 2016 that advocates for the use of open source, Alvand Salehi, a White House Senior Technology Advisor, said during a keynote at the May 2017 O'Reilly Open Source Convention in Austin.

One reason this is a big deal is the federal government spends billions of dollars on thousands of software transactions. Many of those transactions are duplicative. "The government is actually unknowingly spending money for software that is already developed," he said. "Needless to say, that is highly inefficient and quite frankly it's unacceptable, and we decided that we had to put an end to it."

That's why the Federal Source Code Policy requires that all contracts for custom-developed software allow that code to be shared and reused across the entire federal government. It also established a pilot program that requires agencies to release at least 20 percent of new custom-developed code as open source software for three years. There are exceptions for national security and privacy reasons, and to prevent the release of any sensitive information.

You can access links to agencies' open source projects on Code.gov, which Salehi said isn't going away with the change in administration. The Trump White House is supporting this movement, and agencies are working to comply with the policy's requirements.

As of May 2017, 90 percent of the agencies covered by the policy had released code on Code.gov. Projects include applications to track training engagements between NATO advisers and Afghan officials, evaluate and respond to telework requests and scan domains for HTTPS best practices.

"We've come a long way in the world of open source as a community," Salehi said. "But we're not quite out of the woods yet. I promise you culture change and we are delivering on that promise, but we still have miles and miles to go before we reach the end of this journey."

Lifecycle of an Open Source Project

There is a very disciplined, structured methodology that governs successful open source projects. Below we've outlined some of the key steps involved, as well as the major players. Most of these roles will likely be filled by government employees or those hired to do the work. Depending on the nature of the project, there may also be contributions from people outside of the organization.

STEP 1. FEASIBILITY ANALYSIS

Open source software (OSS) gets approval from the agency for public release. Usually this means its purpose and scope have been documented to see if they meet users' needs. If it is an improvement from an existing project, it is released to the main OSS project in whatever format changes are preferred.

STEP 2. DESIGN & DEVELOPMENT

Development through a collaborative process. OSS projects have a "trusted repository," where users can get the "official" version of the program. The project creators or developers start this repository.

STEP 3. USER DEVELOPMENT & CONTRIBUTION

Trusted developers can modify the trusted repository and determine who else can become a trusted developer. Other developers can make changes to local copies but must submit their changes to a trusted developer to get them into the trusted repository.

STEP 4. MERGING USERS

Users can send bug reports to the trusted repository, where they can be shared with everyone.

STEP 5. SNOWBALL USER EFFECT

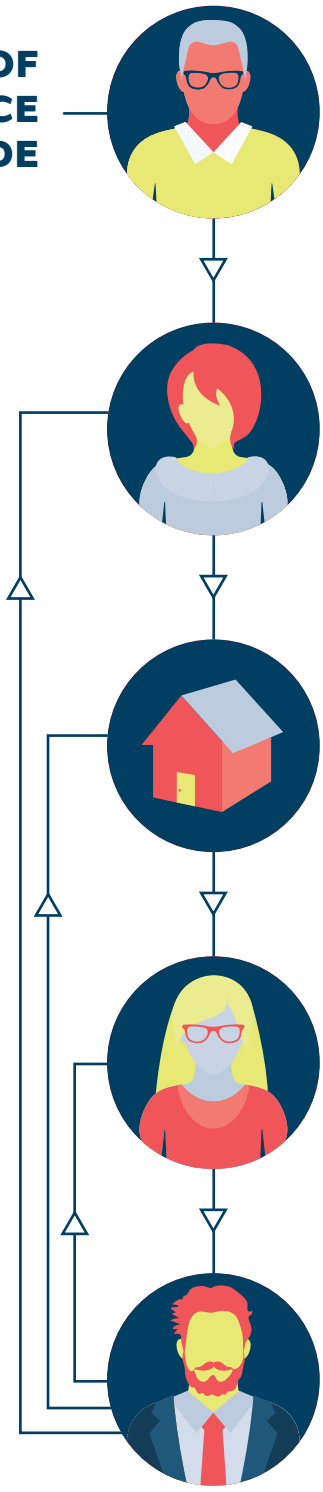
An avalanche of users creates a "virtuous cycle." As an OSS program becomes more capable, more users are attracted to using it. Users continue to contribute changes and improvements. As more people use the product, more users become potential developers.

STEP 6. COST SHARING & MAINTENANCE

Cost-sharing between users is similar to proprietary models, but costs are per-improvement or per-service. The OSS model's cost is more reflective of development and maintenance, more closely reflecting the economics of software development.

Source: Defense Department

Open Source Key Players



Source: Defense Department

DEVELOPER

Developers involve the people who initiate and contribute to the development of OSS. The developer is responsible for ensuring the software works in the correct manner.

TRUSTED DEVELOPER

Trusted developers are the people who contribute to the development of the OSS continuously and gain the trust of initiators through constant involvement in the development process. They also make updates and changes in the trusted repository.

TRUSTED REPOSITORY

This is also known as the data house. It's where all the information related to OSS can be retrieved and stored. The user and trusted developer scan and access the repository directly, or through the distributor. The trusted repository specifies the space from where users or trusted developers can get the official OSS software.

DISTRIBUTOR

Distributors are the people who have the copy of developed OSS and are currently using it. They perform other tasks including modifying, integrating, testing and configuring.

USER

These are the people who use OSS. Users can be categorized as passive or active. Passive users are those who download the software for use but never participate in development. The active user participates in the development process, such as finding bugs and reviewing OSS.

Agencies Tap Into the Power of Open Source

An interview with Adam Clater, Chief Architect for North America Public Sector, Red Hat

The appetite for open source software in government has evolved greatly over the past decade, from skepticism about its security and reliability to more agencies using it for mission critical operations that are essential to their purposes.

Part of that evolution can be credited to early efforts by the Office of Management and Budget and the Defense Department to clarify that open source is suitable for government use and should be treated the same as any other government procurement. Not only were federal agencies encouraged to use open source software, but the Federal Source Code Policy released in August 2016 made clear that agencies were now expected to contribute at least 20 percent of their custom-developed code to the public as open source.

"That was fundamentally transformational," said Adam Clater, Chief Architect for North America Public Sector at Red Hat, a leading provider of open source solutions. Red Hat has been a key player in the government open source movement for years, with countless agencies relying on the company's expertise and innovative solutions.

If you look at the overall growth and adoption of open source software, government has been contributing to these types of projects for decades, Clater said. But it took years to build up the credibility of open source.

Take the Linux operating system, for example. It was initially viewed as a small utility service that organizations eventually used for lower-risk projects, such as running Domain Name Servers, which store domain names and translate them into Internet Protocol addresses. Small wins for those projects promoted organizations to use open source for running web servers and application servers.

Today, open source is an integral part of IT operations at a growing number of government agencies — including military, civilian and state and local governments.

Clater noted several defining moments, particularly in industry, that contributed to increased open source adoption in government. One of those inflection points was when Red Hat announced it would build a Linux operating system for enterprise organizations. Soon after, Oracle and Red Hat joined forces to announce that the Oracle database would be certified to run on Red Hat Enterprise Linux.

"For the first time, agencies were not forced to buy proprietary hardware and systems to run Oracle databases," Clater said.

Adoption has rapidly evolved since then. And today, military and civilian federal agencies, as well as state and local entities are also taking advantage of the benefits that open source has to offer. But these environments demand enterprise grade security and support, as well as expert training and consulting services to deliver on government missions.

For example, NASA's Jet Propulsion Laboratory (JPL) built a private cloud based on Red Hat OpenStack Platform to process requests from flight projects and researchers working with mission data. The state of Tennessee chose a Red Hat open source solution to replace proprietary middleware software that hindered its ability to add functionality to its existing systems, develop new ones and scale to meet market demands.

For skeptics who are still concerned about the security of open source, Clater highlighted a 2014 Coverity analysis that found proprietary software had a higher defect density (.76) than open source software (.61). Defect density tracks the number of defects per 1,000 lines of software code.

Clater noted that a score of 1 is considered acceptable in the commercial world, and open source beat that score by almost half. Open source advocates are firm believers in the saying that "many eyes make all bugs shallow," referring to the fact that there are greater opportunities to spot issues with the code because more people are looking at it.

In the end, the success of open source projects comes down to proper education and training about what the software has to offer. The abundance of success stories continues to dispel myths about the reliability and security of open source that have hindered government adoption in the past.

Plus, agencies have greater access to training to enhance their understanding and use of open source. Red Hat offers free, self-paced courses that students can audit or receive a verified certificate for a small fee. These types of partnerships are vital.

"Software inherently has sharp edges," Clater said. "If agencies want to tap into the most thriving technology, they need a partner like Red Hat to help them in their quest to revolutionize their business."

Myths + Facts About Open Source

Across government, there have long been perceptions that code developed in the open is insecure, and that open source software isn't commercial software and therefore cannot be procured by the government.

In terms of cost, there's also the assumption that open source software is completely free, which can be misleading because you'll often see agencies refer to it as free and open source software (FOSS). Free, however, refers to the autonomy that users have to make changes to the software as they see fit.

These are just a few of the misunderstandings and barriers to open source adoption in government, despite the fact that policies expressly permit the use of open source and have for a number of years, said David Wheeler, an expert on developing secure software who helped develop DoD's open source policy. Part of the issue is that it takes years for those policies to trickle down and be incorporated into how agencies do business, he said. But open source adoption is happening at increasing rates across all levels of government.

We spoke with government technologists, lawmakers and other experts to debunk common myths and help your agency make fact-based decisions about using open source.

MEET THE EXPERTS

SAM ASHBAUGH
Pittsburgh's Chief Financial Officer

ALEXIS BONNELL
Division Chief Applied Innovation and Acceleration for U.S. Agency for International Development's U.S. Global Development Lab

DEBORAH BRYANT
Board Director of the Open Source Initiative

NELLIE GORBEA
Rhode Island's Secretary of State

DANIEL HANTTULA
Vice Chancellor of Innovation within Oklahoma's Office of Management and Enterprise Services – Information Services Division

MARK HAYES
Chief Technology Officer at the Housing and Urban Development Department

BEN KALLOS
New York City Council Member for the 5th District

KANE MCLEAN
Member, Military Open Source Software

ANDREW OWEN
Executive Director, Open Justice Broker Consortium

ALVAND SALEHI
White House Senior Technology Advisor

ROB C. THOMAS, II
Acting Chief Information Officer and Principal Deputy Assistant Secretary for Information and Technology at the Veterans Affairs Department

DAVID WHEELER
Open source expert

MYTH
#1

Open source *is insecure.*

THE RUMOR MILL:

Proprietary software is always more secure. Releasing source code makes it possible for attackers to construct highly targeted attacks against the software and build malware directly into the code.

FACTS:

Some open source software is secure and some is not — just like propriety software. So how do you know if the open source software you want to use is secure?

"You evaluate it," Wheeler said. "One advantage of OSS is that you can easily evaluate it in more detail, and others can do the same. That doesn't automatically mean the OSS is secure, but it does give you a better chance to understand your options."

One of the big misconceptions is that anyone can change the kernel, or the core of an open source operating system, said Bryant, who also leads the Open Source Initiative's public policy working group. "It's a very disciplined, structured methodology, and there's a gatekeeper that makes the decision about any code that goes in."

Because everyone can look at the code, anyone can spot problems with it, including bugs, and report them.

In one DoD analysis of open source, one unexpected finding was the degree to which security depends on open source software. Banning it would remove certain types of infrastructure components that support DoD network security, according to the report. It would also limit the department's access to and expertise in using powerful open source applications that hostile groups could use to help stage cyberattacks.

DoD is using open source software to support a number of missions, including a NATO mission to help advise Afghan officials on how to rebuild the country. The department's digital team developed a beta version of the tool in less than four months and released the project on Code.gov. It enables NATO advisers to keep tabs on who has received training.

The DoD team installed the software on a classified secret server in Afghanistan, and then released the self-contained project as open source. Assuming all the information exchanged as part of the NATO mission is classified and confidential, wouldn't releasing the tool as open source pose a national security risk?

The short answer: no. Open source doesn't mean releasing personally identifiable information, Salehi said. That information shouldn't be a part of the code, whether it's open source or not.

QUICK TIPS:

1 **Newer developers are often familiar with open source software and instead of fearing it, they expect to use it.**

2 **Have a process in place for approving new open source projects, or else your team will be taxed with implementations and forced to support one-off projects.**

3 **If you're managing an open source project, make sure to understand any gaps between your department's needs and what the software can offer.**

MYTH
#2

Government doesn't have the necessary skillsets to support open source.

THE RUMOR MILL:

Agencies rely on contractors and don't have the in-house staff or support to manage and maintain open source software.

FACTS:

It's true that agencies work closely with industry to implement and maintain software, but there are many instances where agencies have developed their staff to tackle these projects in-house.

Several agencies, including the Housing and Urban Development Department, have launched internal digital service teams to lead software-based projects. HUD already has talented user experience professionals on board, and the department is looking to hire more developers to fill out its digital services team, Hayes said.

At the state level, Oklahoma's Office of Management and Enterprise Services – Information Services Division (OMES-IS) is proof that government can and should invest in employees by supporting efforts to learn how to review code, test it and add new features to software.

Back in 2012, the state unified IT staff under OMES Information Services. Some employees were uneasy with the transition, but the agency worked with them to ease those concerns and identify how their skills could best serve the organization.

Open source played a key role in the state's ability to withstand the changes. Unlike the skills needed to manage proprietary software, the skills needed to support open source software are more common because of the collaborative nature of how that software is developed. This made it easier for the state to fill vacant positions with employees who already had the skillsets needed to manage the state's software.

There's also a role for industry to play. Open source is all about collaboration, so it's highly likely that your agency will be partnering with contractors on some open source projects. You may find that these engagements are less costly than working with a vendor to support proprietary software.

Government agencies have had that experience in several areas, including web hosting and managed services. In some instances, Oklahoma will call in outside experts to install the software, but employees will manage it long-term.

The government can only outsource so much, Gorbea said. "I really believe very strongly that government needs to embrace open source. We're really at a time where government just needs to be able to own and produce basic IT programs and functions."

Although technical skills are critical, there are other soft skills that make a project successful.

"A lot of times when people talk about open source, they mean Drupal and repository," Bonnell said. "We take that open source construct from a technology lens, and we believe that you have to start an open source project from the very beginning as an open partnership as well," she said

QUICK TIPS:

1 **Newer developers are often familiar with open source software and instead of fearing it, they expect to use it.**

2 **Have a process for approving new open source projects, or else your team will be taxed with implementations and forced to support one-off projects.**

3 **If you're managing an open source project, make sure to understand any gaps between your department's needs and what the software can offer.**

MYTH
#3

Open source *is not commercial software.*

THE RUMOR MILL:

Agencies have to decide whether they want commercial software or open source software. Plus, open source software licenses are not compatible with government acquisition regulations.

FACTS:

Open source software is almost always classified as commercial software, according to the Federal Acquisition Regulation (FAR) and DoD's supplement to the FAR.

The FAR makes clear that a commercial item is any item, other than land and buildings — also known as real property — that is used by the general public or nongovernmental entities for purposes that are not unique to government. Not only that, but the item must have been sold, leased or licensed to the general public.

Open source software meets those requirements. "In the law and the regulations, everything hinges around definition," Wheeler said. "It's important to understand that open source software is commercial software because it eliminates what I call open source software paralysis."

Some people are crippled by the misconception that open source software licenses aren't compatible with government acquisition. "If someone hasn't had any experience, it's just an easy way to deflect something you maybe don't understand," Bryant said.

For anyone who isn't compelled to have these conversations, Wheeler noted that the federal regulations state a preference for commercial items.

"You are required, and not just in government but your contractors … are required to look at the commercial item," he said. "And since open source software is commercial, they're required to look at open source. So, let me emphasize that another way: If you're a contractor for the government and you're not looking at open source software, you are disobeying the law — that simple. Now, do you have to use it? No. But you have to look at it and consider that option."

Oklahoma's Hanttula noted one caveat that government employees in his state must keep in mind. "We have a challenge where individuals and police are not allowed to accept licensing agreements," he said.

The reason is most licensing agreements state that if there is a disagreement between the person selling the software and the buyer, the buyer most go to the seller's state to resolve the issue. It's against the law in Oklahoma for a state employee to agree to those terms.

"My biggest warning … for anyone who [is] going to undertake this sort of initiative is befriend a lawyer on your team," Hanttula said. "Go to your legal counsel at your agency, and have them review software license agreements as the very first step."

QUICK TIPS:

1. **Coordinate upfront with your agency's general counsel and have them review the software license agreement.**
2. **Establish the basics with your staff, including the fact that open source software is commercial software.**
3. **Consider creating an open source policy for your agency that establishes requirements to thoroughly evaluate open source software solutions when acquiring software and to consider the use of open source development practices.**

MYTH
#4

Open source *is not enterprise-grade.*

THE RUMOR MILL:

Open source software doesn't scale well to meet the demands of large government agencies.

FACTS:

There are too many examples to name in this guide, but we'll run through a few that prove open source software can support large-scale initiatives in government.

Let's start with the VA. In the early 1980s, the VA released the underlying software for its electronic health record (EHR) system in the public domain without restriction. Decades later in June 2011, the VA established the Open Source Electronic Health Record Alliance (OSEHRA) as the central governing body that oversees the community of EHR users, developers and service providers. Today that system, known as Veterans Health Information Systems and Technology Architecture (VistA), serves more than 1,800 hospitals and other healthcare providers around the world, according to OSHERA.

As the IT leader of the second largest federal department, the VA's acting CIO, Rob Thomas II, said that "the open source community will be more important to the VA than ever, and VA will drive more robust participation in open source development."

Thomas made those comments at the 2017 OSEHRA Open Source Summit, on the heels of the VA secretary's announcement that the department is moving to a new commercial EHR system — on par with what DoD uses. Some wondered if the change in direction signaled an end to the VA's relationship with open source, but Thomas said the agency will work with OSEHRA to maximize the reuse of technologies funded by the VA and identify opportunities for open source products.

At HUD, Hayes is using open source to modernize aging systems and applications. "We're going from [the computer programming language] COBOL to an open source platform," he said, noting that HUD has moved more heavily into open source over the past two years. "That's our model for our legacy systems now."

The goal is to build these new systems in the cloud and do so using open source technology. HUD implemented an open source enterprise bus solution that will facilitate communication between different services, including the department's records management and workflow solutions. The Federal Housing Administration's Loan Review System (LRS), which makes it easier for lenders to do business with FHA, is also built on open source. LRS is an electronic platform that provides a more precise and transparent methodology for FHA mortgage loan reviews.

"We're beginning to set up all the building blocks, so that any future application development can take advantage of these products that we've already got in place," Hayes said. "We've done demonstrations at different areas of the department, and it has created a demand for more systems being built on this open source stack."

QUICK TIPS:

1. **Open source can be a cost-effective option for modernizing legacy systems.**
2. **Work with your team to test open source software before it is released into production.**
3. **Involve end users in the development and testing of software that will be used across your agency.**

MYTH
#5

Open source *is immature & lacks industry participation and community support.*

THE RUMOR MILL:

Open source does not have the same level of support as proprietary software because it's built by contributing volunteers. These projects are developed by people in their spare time and not a dedicated staff from a reputable company.

FACTS:

Governmentwide, the appetite for open source is forcing proprietary software vendors to not only consider incorporating the software into their solutions but also embrace the openness and interoperability associated with open source software.

In addition to traditional proprietary vendors contributing to the open source community, there are also communities of interest focused on developing and supporting open source software.

One example is the Open Justice Broker Consortium (OJBC), a nonprofit membership organization of government agencies and jurisdictions focused on improving justice information-sharing through the reuse of low-cost, standards-based integration software.

OJBC develops open source solutions, new software, new components and makes them publicly available through a GitHub repository where anybody can download software and use it in accordance with the license, Owen said.

There are a lot of organizations, including the OJBC, that provide reliability and support for the software while also continually evolving it, Owen said. Several state and local entities have signed on as member organizations of the consortium, including Hawaii, Maine, Michigan, Vermont, Adams County, Colo., and Pima County, Ariz.

"When you talk about … how members benefit, what it really boils down to is cost savings through reuse and collaboration," Owen said.

Owen shared an example of a common challenge that probation officers in Hawaii and across the country face. They manage large caseloads with dozens or even hundreds of probationers they must monitor. They didn't have visibility into whether a probationer had been arrested, other than relying on the individual telling them.

OJBC developed a system that automatically notifies probation officers when their probationers have been arrested, what the cause was and the arresting officer. In a matter of months, officers went from having no awareness at all to getting real-time email alerts on their phones about probationers.

The system was originally developed for Hawaii, but when Vermont caught wind of the development, the state turned to OJBC to build on that framework by adding a capability to notify its officers of any law enforcement activity that probationers are involved in, including being a witness to or victim of a crime.

"We recognize that these agencies across the country are all trying to solve a lot of the same problems, so they need to automate information exchanges for certain business purposes," Owen said. "But why should everybody figure it out on their own? Why don't we just figure it out once and share that solution, and then as we're sharing it, enhance that solution, make it better and better?"

QUICK TIPS:

1. **Connect with organizations that provide reliability and support for open source software while also continually evolving it.**
2. **Don't reinvent the wheel. Collaborate with other government agencies to build on their open source developments.**
3. **Consider joining an open source project and contributing by lending your coding, writing, planning or design skills.**

MYTH
#6

Open source *is completely free.*

THE RUMOR MILL:

Open source software is often referred to as free and open source software, or FOSS, because there are no costs associated with it.

FACTS:

"The word free in FOSS refers not to fiscal cost, but to the autonomy rights that FOSS grants its users," according to a DoD report.

Open source emphasizes the right of users to study, change and improve the source code. The DoD report also notes that software that qualifies as free almost always qualifies as open source, too, and vice versa.

When it comes to cost, what makes open source attractive is you can download and pilot community versions of the software without committing to it contractually and financially. "That allows us to innovate faster than we were in the past," Hayes said.

"With free and open source, people understand that if they don't like something, they can change it, or they can fix it," said Kallos. "So generally, when you have a team, they're usually spending most of their time on adding new features. But the difference being that when you add a new feature, you're not paying one company to give you that proprietary feature, which they're then reselling at full markup to everyone else. When you get that feature, everyone else does, [too]."

In essence, you are getting the software for free, but costs do come later. As with any other software, securing vendor support is where the costs come in. Even if management support is done in-house, there will be costs for doing the work. But open source users say it's often less.

If you're trying to gain buy-in for open source, this can be a huge selling point. "The idea is that's a free thing, no one's paying for it, but people are benefiting from it, and they can go worry about spending money on other things that are more important to them," Bryant said.

But as needs change, it's inevitable that there will be costs to enhance applications and systems. In Pittsburgh, the city worked with Code for America to produce several applications that improved its procurement process by making business opportunities with the city more transparent to companies.

Users could download solicitations but they couldn't submit them, Ashbaugh said. That was value-added functionality the city didn't have a need for early on, but as its procurement process matured, the city was able to enhance those capabilities by investing in a commercial off-the-shelf e-procurement system.

"I look at it as an iterative process," Ashbaugh said. "Code for America folks came in and helped build three great tools that really advanced our ballgame, and then we had to take it to the next level. We needed more sophisticated tools than we had, and so it's kind of a progression — each building on the previous step."

QUICK TIPS:

1. **Software that qualifies as free almost always qualifies as open source.**
2. **As with any other software, securing vendor support is where the costs come in.**
3. **Open source means free access. In other words, employees can tinker with the software and add features that can save the agency time and money.**

MYTH
#7

Open source *is a fad.*

THE RUMOR MILL:

Open source happens to be a trend right now, so why should I make it part of my IT strategy?

FACTS:

Open source software is far from a fad. It has been around for decades — Linux is one example — and even the DoD acknowledges that its security depends on free and open source software.

Open source has proven reliable and secure for NASA, Google and countless other organizations.

In fact, there's an entire community of civilian and military open source software and hardware developers across the United States who work for and with DoD to adopt open technology innovation. "In the military, we tend not to have big announcements of people working together on things, just because of general paranoia about national security," said McLean, a member of the Military Open Source Software (Mil-OSS) community.

"That doesn't mean people aren't tagging up with each other and working together as a community on things, they're just not publishing it to a website," he said. "You just typically don't wander into projects that are running weapons systems."

But open source is about more than just the technology, said USAID's Bonnell.

"A lot of times when people talk about open source, they mean Drupal and [a] repository," said Bonnell. "I think for us, co-creation is also just the general idea of bringing different people [and] organizations together, [and] letting them bring the very best of what they do, and figuring out really how we leverage each other's special sauces."

Bonnell's team used open source software to collaborate with other nations and organizations to stand up the Global Innovation Exchange, a platform created for innovators, entrepreneurs and investors to work together on solving humanity's greatest challenges around gender equality, energy solutions and more. Today the exchange boasts more than 5,000 innovations, about 19,000 collaborators and nearly $90 million in funds to support innovative ideas.

USAID told the vendor supporting the project that it should share the underlying code with any agency in need of similar capabilities.

"We think open source is a fast track to synergy for those who are open to finding their similarities versus their differences," Bonnell said. "And, of course, it's not a perfect solution for everything and everyone, but we really think that that pursuit of synergy is going to be the game-changer for government, and for the average citizen experience in the future."

QUICK TIPS:

1 **Customers are demanding open source solutions from industry, forcing proprietary vendors to embrace open source.**

2 **There are open source products that have been around for decades — Linux-based software is one of them — and they have proven reliable and secure for government and industry.**

3 **Open source is about more than just technology but also a way of co-creating to benefit from shared ideas.**

Conclusion

Open source is an integral part of our personal and professional lives.

It powers our favorite websites, internet browsers and even supports the tools we use in the workplace to provide online resources for citizens, track workforce hiring, support cloud solutions and even bolster cybersecurity.

These are capabilities that agencies need at all levels of government, so why not share the software solutions that power those efforts? "There's no use in all of us recreating the wheel every time," Hayes said. "We're not that profoundly unique, as we like to say."

By law, federal agencies are supposed to show a preference for commercial software, which means open source should at least be considered as an option. It won't be the answer for all of government's needs, but it should be evaluated.

The challenge is that misconceptions around open source have hindered its release and adoption in government. Some of the biggest concerns are around security and continued support of the software. "There's a lot of growing pains in great part due to just unfamiliarity and also due to the many barriers," Wheeler said. "But I think those barriers are slowly declining over time."

Many experts agree that the release of open source software is increasing. Initiatives such as the Federal Source Code Policy are spurring those advancements. Several agencies, including DoD, NASA and the Consumer Financial Protection Bureau, are leading the charge by showing the benefits of open source and how those perks extend far beyond government.

For example, NASA has shared thousands of its software programs with students, industry, individuals and other government agencies, resulting in new innovations, companies and capabilities. Other agencies, including USAID, are embracing open source to save money and reap the benefits from collaborative software development.

"As far as debunking the arguments and myths, innovation work across USAID is really geared to driving and building off each other's work," Bonnell said. "We find that when we do that well, we not only reduce the constricting factors of time, people [and] money, but we usually end up with a greater program and/or product that benefits the U.S. taxpayer."

Open Source Project Checklist

When you've found a project you'd like to contribute to, do a quick scan to make sure that the project is suitable for accepting contributions. Otherwise, your hard work may never get a response.

Here's a handy checklist to evaluate whether a project is good for new contributors.

1 MEETS THE DEFINITION OF OPEN SOURCE

- ☐ Does it have a license? Without a license, your project isn't open source. Usually, this is a file called LICENSE in the root of the repository.
- ☐ Is the license approved by the Open Source Initiative or Free Software Foundation?
- ☐ Is your license compatible with the rest of the ecosystem?

2 PROJECT ACTIVELY ACCEPTS CONTRIBUTIONS

Look at the commit activity on the master branch. On GitHub, you can see this information on a repository's homepage.

- ☐ When was the latest commit or change?
- ☐ How many contributors does the project have?
- ☐ How often do people commit or make changes? (On GitHub, you can find this by clicking "Commits" in the top bar.)

3 NEXT, LOOK AT THE PROJECT'S ISSUES

- ☐ How many open issues are there?
- ☐ Do maintainers respond quickly to issues when they are opened?
- ☐ Is there active discussion on the issues?
- ☐ Are the issues recent?
- ☐ Are issues getting closed? (On GitHub, click the "closed" tab on the Issues page to see closed issues.)

4 NOW DO THE SAME FOR THE PROJECT'S PULL REQUESTS

Pull requests let you tell others about changes you've pushed to a GitHub repository.

- ☐ How many open pull requests are there?
- ☐ Do maintainers respond quickly to pull requests when they are opened?
- ☐ Is there active discussion on the pull requests?
- ☐ Are the pull requests recent?
- ☐ How recently were any pull requests merged? (On GitHub, click the "closed" tab on the Pull Requests page to see closed PRs.)

5 PROJECT IS WELCOMING

A project that is friendly and welcoming signals that they will be receptive to new contributors.

- ☐ Do the maintainers respond helpfully to questions in issues?
- ☐ Are people friendly in the issues, discussion forum and chat (ex.: IRC or Slack)?
- ☐ Do pull requests get reviewed?
- ☐ Do maintainers thank people for their contributions?

Source: Open Source Guides

Open Source Migration Worksheet

For IT managers and practitioners who are planning or doing a migration to open source, here are questions to consider.

Can you think of reasons you would want to migrate to open source?

Before migrating to open source, you want to have a clear understanding of the reasons why you want to make the change.

Do you have an active, supportive IT workforce who can handle the change to open source?

Can you think of other people who will support the migration and can get others onboard with OSS?

Make sure this is someone who will back you up — the higher up in the organization, the better. Find and build relationships with people who are involved in the OSS movement.

Where and how will you manage the migration to OSS?

Start with noncritical systems and ensure that each step in the migration is manageable.

How will you ensure interoperability of systems?

How will you support mobile users?

How will you identify remote users?

How will you build manageable systems?

How will you ensure that security is designed in from the start and not tacked on as an afterthought?

Source: The IDA Open Source Migration Guidelines

About & Acknowledgments

ABOUT GOVLOOP

GovLoop's mission is to "connect government to improve government."

We aim to inspire public- sector professionals by serving as the knowledge network for government. GovLoop connects more than 250,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to connect and improve government.

For more information about this report, please reach out to info@govloop.com.

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