Virginia Information Technologies Agency

Enterprise Architecture Technical Brief

Open Source

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Contents

OSFA Organization Logo

Open Source Recommendation

Open source is encouraged and is to be treated the same as any other type of software.

- All software including "open source" used for development and support of Commonwealth and/or agency "mission critical applications" must be at a version/release level that has vendor or equivalent quality level support available. This support should include security hot fixes and updates.

Please review VITA's open source policy as identified in the EA200 document.

Open Source Initiative Organization Logo

For any comments, questions, and/or concerns with this technical brief, please contact VITA EA: ea@vita.virginia.gov

Open Source Background Information

Open Source Risk – Fact or Fiction? [1]

- Today over half of a software product is open source – developed outside the organization.
- Open source software (OSS) has allowed organizations to become very nimble.
- When you're working with open source code but you're not managing vulnerabilities and compliance, you put your products and customers at risk. You're also hurting the community instead of helping it.

Implementing and Managing Open Source Compliance Programs – A Crash Course. [2]

- Open source compliance refers to the aggregate of:
    - Policies
    - Processes
    - Training
    - Tools
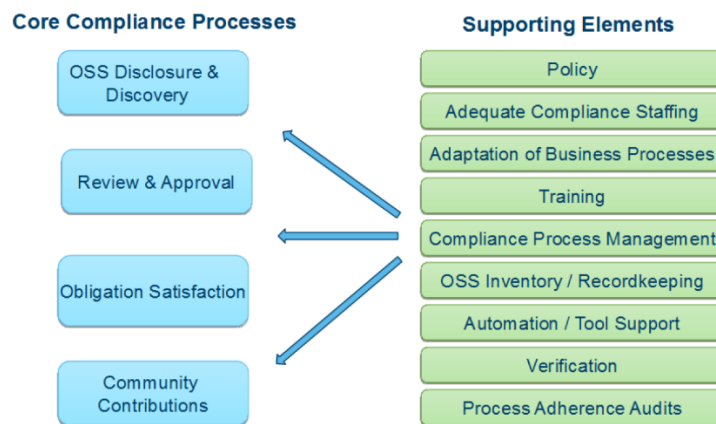
Compliance Approach in a Nutshell.

- When a vendor discloses open source, what do they need to tell you?
    - Package Name
    - Version
    - Original download URL
    - License and license documentation
   - Description

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[1] Open Source Risk – Fact or Fiction? A Flexera Open Source Risk Report. Retrieved from the web in February 2018.

[2] Implementing and Managing Open Source Compliance Programs – A Crash Course. Open Source Strategy Forum – November 8, 2017 in NYC. Samsung Research America. Retrieved from the internet in February 2018.

- o Modified code
- o Included dependencies
- o Intended use in the product
- o Development team's point of contact
- o Availability of source code
- o Where source code will be maintained
- o Whether the packages has previously been approved for use in another context
- o License obligations
- o Inclusion of technology subject to export control
- o Other items that might be necessary for license obligations such as
    - Copyright notices and attributions.
    - License text.
    - Source code (including modifications the supplier made) for open source software that carries an obligation to offer source code to recipients.
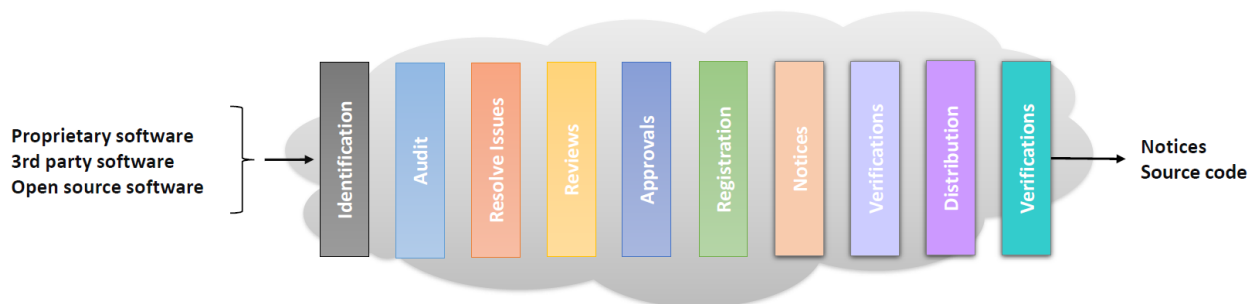
Open Source Compliance End to End Process.

- Figuring out how open source software is licensed and where it's being used is a huge challenge.
    - o Retain license information at the time you download the software because backtracking doesn't always work.
    - o Save the web site from which you downloaded the open source package in addition to a mint copy of the package.
    - o Many open source license are incompatible with each other, especially when mixing licenses with the GPL.
    - o License compatibility issues arise when developers combine source code incoming from different sources, under different licenses, into a single work.
    - o Open source compliance today is generally more of a scalability and cost issue, not as much a license interpretation debate.

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- There are three main sources for source code:
  - Proprietary
  - Third Party Commercial
  - Open Source

How Companies are Working with Open Source. [3]

- Open source is everywhere.
- Open source is no longer optional. [4]
  - 78% of companies run on open source.
  - Less than 3% do not use open source in any way.
- 9 of 10 top public clouds run on Linux, which is itself open source. [5]
- Comcast selected open source for innovation not cost.
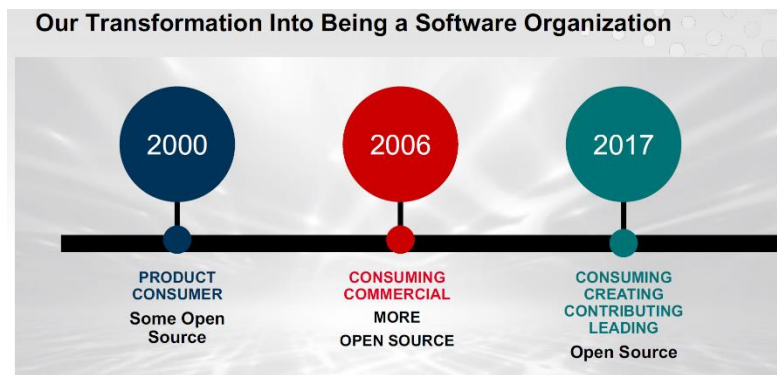
Open Source for America – Enabling Public Sector Adoption of Open Source. [6]

Primary benefits of open source software are:

- Choice
  - The source code of open source software is available to all.
  - May be operated and maintained by multiple vendors, reducing both barriers to entry and exit.
  - A customer can easily choose another vendor.
- Reliability
  - Open source is peer reviewed software, which leads to more reliability.

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[3] How Companies are Working with Open Source by Comcast. Nithya Ruff – Head of Open Source Practice and Director of the Linux Foundation Board of Directors (BOD). Retrieved from the internet in February 2018.
[4] 2015 Future of Open Source Study Results from BlackDuck. Obtained from presentation titled, "How Companies are Working with Open Source by Comcast." Retrieved from the aforementioned document in February 2018.
[5] The Linux Foundation. Information obtained from presentation titled, "How Companies are Working with Open Source by Comcast." Retrieved from the aforementioned document in February 2018.
[6] Open Source for America – Enabling American Public Sector Adoption of Open Source. Retrieved from http://opnesourceforamerica.org on February 20, 2018.

- o The infrastructure of the Internet is largely composed of open-source programs such as DNS, sendmail, Apache and languages such as HTML and Perl.
- Low-cost
  - o Open source software is often developed through community forums and collaboratives.
  - o Open source software typically does not have a per-seat licensing cost.
  - o According to Gartner, open source is even more attractive to businesses during tough economic times.
- Security
  - o Open source enables anyone to examine software for security flaws.
  - o Continuous and broad peer-review enabled by publicly available source code improves security through the identification and elimination of defects that might otherwise be missed.
  - o The availability of source code facilitates in-depth security reviews and audits by government customers.
- Fast deployment
  - o With open source software consumers needn't wait years to deploy a solution.
  - o Open source software can be "test driven" prior to procurement, and is particularly suitable for inter-agency collaboration, rapid prototyping and experimentation.
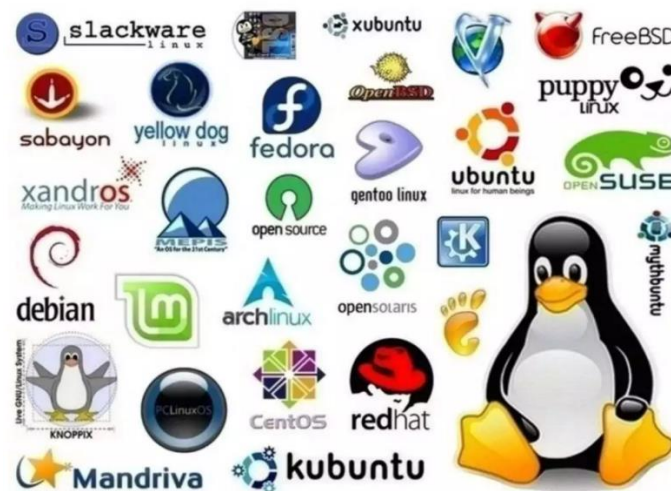
Linux System Features

Image Source (http://www.iuvmtech.com/wp-content/uploads/2017/08/distros-1024x768.jpeg)

VITA Open Source Background Information

Commonwealth of Virginia Strategic Plan for Information Technology. [7]

- Open source provides cost savings, interoperability, long-term archive, quicker time to market for software, and increased innovation.
- Open source is a catalyst that will restructure the industry, producing higher-quality software at a lower cost." Gartner Group Publication ID Number: G00125868.

Commonwealth of Virginia (COV) Information Technology Resource Management (ITRM) Enterprise Architecture (EA) Policy – EA200. [8]

- Purpose: This policy establishes the Commonwealth's EA as the primary source for providing information technology direction and technical requirements which govern the acquisition, use and management of information technology resources by executive branch agencies – See EA200 for explicit verbiage regarding open source software.

The aim of open source is the product is more understandable, modifiable, duplicable, or simply accessible. "Open source software":

- Refers to computer software and the availability of its source code as open source under an open source license to study, change, and improve its design.
- Generally allows anybody to make a new version of the software, port it to new operating systems and processor architectures, share it with others, or market it.
- Doesn't just mean access to the source code.
- Distribution terms must comply with select criteria as recommended by the Open Source Initiative and specified in EA200.
- Treated the same as any other type of software.
    - All software including "open source" used for development and support of Commonwealth and/or agency "mission critical applications" must be at a version/release level that has vendor or equivalent quality level support available. This support should include security hot fixes and updates.

Licensing must not restrict other software:

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[7] Commonwealth of Virginia Strategic Plan for Information Technology – Results of Stakeholder Workshops. Retrieved from https://www.vita.virginia.gov in February 2018.
[8] Commonwealth of Virginia (COV) Information Technology (IT) Resource Management (ITRM) Enterprise Architecture (EA) Policy – EA200. Retrieved from Https://www.vita.virginia.gov in February 2018.

- The license must not place restrictions on other software that is distributed along with the licensed software.
    - For example, the license must not insist that all other programs distributed on the same medium must be open source software.

Please be sure to review the explicit policy verbiage as identified in EA200.

Commonwealth of Virginia Enterprise Technical Architecture (ETA) - Application Domain Report. [9]

Domain-wide Principles, Recommended Practices, and Requirements.

The following principles, recommended practices, and requirements pertain to all components, in all situations and activities related to the ETA Application Domain. Component.

- Domain-wide Recommended Practices
- APP-RP-08: Open Standards
    - Agencies should select open-standards based products, tools, designs, applications, and methods where appropriate to reduce integration and infrastructure complexity.
    - Rationale:
        - Use of standard interfaces and products that adhere to open standards will help reduce complexity associated with an IT environment.
        - Use of open standards-based products reduces the need to develop custom solutions for component interoperability, thus reducing time and cost developing and supporting new systems and upgrades.
        - Less complex structures and better integration means easier information access and sharing, encouraging use of the resources.
        - Risks associated with system implementation and upgrades will be reduced.
        - Applications will behave in a logically consistent manner across user environments.
    - Application Interfaces
        - Recommended Practices:
            - APP-RP-17: Interfaces Should Utilize Web-services – All interfaces for newly developed or purchased (COTS) applications, reusable components and services should utilize web-services developed to industry/open standards.
            - Rationale:

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[9] Commonwealth of Virginia Enterprise Technical Architecture (ETA) – Application Domain Report by VITA. Retrieved from https://www.vita.virginia.gov in February 2018.

- o All interfaces should be based on an industry-defined set of open standards to limit the potential for vendor dependency and reduce development complexity.
- o Reuse is a key goal of service-oriented architectures (SOA) and ease of reuse can be maximized by developing and designing open interfaces based on industry standards.

VITA IT Procurement Policy Manual: BUY IT. [10]

Note that open source software attempts to remove a significant IT procurement challenge risk for the Commonwealth, identified as follows:

- Critical Factors in IT Procurement
  - o IT Procurement Challenge
    - Significant barriers to exit.
  - o Impact/Risk
    - Customer is locked in to products or services.
  - o IT sourcing principles to employ.
    - Anticipate transitions/exit strategies.

VITA Information Technology Services Contract. [11]

- F. Open Source
  - o Supplier will notify all Authorized Users if the Solution, Solution Components, Deliverables, Product, Software, Updates, Application and/or Licensed Services, as obligated and provided by Supplier, contains any Open Source code.
  - o And identify the specific Open Source License that applies to any embedded code dependent on Open Source code, provided by Supplier under this Contract.

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[10] VITA IT Procurement Policy Manual – BUY IT; Chapter 2 – How IT Procuring Information is Different, version 6 of 2017. Retrieved from https://www.vita.virginia.gov in February 2018.
[11] Information Technology Services Contract. VITA. Retrieved from https://www.vita.virginia.gov in February 2018.

General Research Information

NASCIO Information Communications Technology Innovations 2017 Awards. [12]

- The primary audience for the Commons is geographic information systems (GIS) professionals, who otherwise spend a high percentage of their time gathering data for any particular project.   The Commons leverages the open source data management system CKAN for search and discovery, and an FTP site for data distribution.

Colorado's Identity Resolution Information System. [13]

- Data sharing within the State of Colorado and among agencies has historically been limited. However, the massive amounts of data collected by those agencies begs for a platform that can store, catalogue and analyze the data for multiple uses, not just onetime projects.

The iData Platform is designed for state data analytics and support for business operations. It allows for the secure storage, integration, and processing of data from a variety of different source systems in a multitude of formats using an agile approach that delivers results more quickly while being responsive to changing analytics and operational needs of the state.

The iData Platform includes four components. The Hybrid Big Data Integration framework component was developed using open source Apache Software foundation, which includes metadata information, contact information, policies generated from the governance framework and any other relevant information required for an entity to understand and use the data. It connects, on the back end, to multiple data sources as well as enterprise data stores. It also provides the ability

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[12] National Association of State Chief Information Officers (NASCIO) 2017 State IT Recognition Awards for Best Uses of IT in State Government, in the area of Information Communications Technology Innovations – State of Minnesota Geospatial Commons. Retrieved from the NASCIO website in February 2018.
[13] Colorado Identity Resolution Information System in the category of data, information, and knowledge management for the Governor's Office of Information Technology.(OIT) – October 2013. Retrieved from the NASCIO website in February 2018.

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to integrate unstructured data to analyze both big data and traditional data sources. Additionally, it includes a strict Roles Based Access rights so that an entity may expose their data to only those members who are allowed access.

The implementation of a robust individual clearance search engine in IRIS has greatly improved the process by which Coloradans receive medical assistance benefits.

Information Sharing and Safeguards: Meeting Citizen Expectations. [14]

- State governments must be able to respond efficiently and effectively when delivering services to citizens. Common standards can maximize access to shared information among federal, state, local, and tribal governments—as well as among our partners in the private sector. Use of national standards will avoid redundant investment and unnecessary variation. NIEM should be integrated into state government enterprise architecture and data management strategy specifically for planning and implementing intergovernmental information exchanges. NIEM provides a broad range of products and capabilities for planning and implementing enterprise-wide information exchanges. Perhaps as important, it is an open-source solution, which allows diverse actors at the federal, state, local, and tribal level to utilize diverse products while maintaining the same framework thus ensuring consistency.

Information Sharing and Safeguards: Meeting Citizen Expectations

Secure Colorado: Achieving Quick and Sustainable Risk Reduction. [15]

- The often named "Year of the Data Breach" 2014 proved to us that no enterprise, regardless of the size of security investment, is immune to attack. At the Colorado Governor's Office of Information Technology (OIT), our security team averts approximately 800,000 malicious

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[14] Information Sharing and Safeguards: Meeting Citizen Expectations by NASCIO in 2017. Retrieved from the NASCIO website in February 2018.
[15] Secure Colorado: Achieving Quick and Sustainable Risk Reduction in the category of cybersecurity, by the Governor's Office of Information Technology in 2015. Retrieved from the NASCIO website in February 2018.

events each day. As the increased volume and level of sophistication of security threats continues to grow, we recognized a new approach was needed for protecting State of Colorado information and assets.

That new approach came through Secure Colorado, the state's first cybersecurity strategic plan. It is focused on achieving quick and sustainable risk reduction at a reasonable cost, while promoting an environment of technology innovation, adoption of open source and cloud based technology and the open sharing of data where appropriate. Secure Colorado is a huge innovation in cybersecurity for the government sector, and it has revamped the state's approach to security by aligning priorities and control framework.

In March 2015, The Brookings Institution cited Colorado as one of only two states to have demonstrated a "solid and robust" understanding of the importance of integrating cybersecurity in their strategic IT plans, and Secure Colorado is the reason for this innovation in applying cybersecurity's importance.

Minnesota Geospatial Commons Project. [16]

- From transportation to environmental conservation, all manner of public, private, and non-profit organizations benefit from readily accessible geographic information. Since the business of Minnesota government increasingly requires state agencies to collaborate – and not just among themselves – it was important to find a systematic way to gather and share this information with entities from other levels of government, academia, and the nonprofit, and private sector.

Stakeholders discussed the concept of creating a single place for all geospatial resources in Minnesota for more than a decade. A collaborative team composed of MN.IT Services staff supporting several state agencies came together to work on the project in 2012, culminating in an official launch of the Minnesota Geospatial Commons in March 2015.

The Minnesota Geospatial Commons provides a successful and scalable framework for documentation, organization and access of geospatial data. Operated by the

Minnesota Geospatial Information Office (MnGeo), a program of MN.IT Services, the Minnesota Geospatial Commons can be found at https://gisdata.mn.gov/.

The concept for creating the Geospatial Commons was simple: create one place for publishers and users to easily share and access geospatial data. A project was initiated with a workgroup made up of a

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[16] Minnesota Geospatial Commons by MNIT Services – an Information Communications Technology Innovation in 2016. Retrieved from the NASCIO website in February 2018.

dedicated project manager and technical staff that supported state agency publishers of geospatial information. The team performed a high-level comparison of three platforms, using twelve evaluation criteria, in order to decide on the front-end solution, CKAN (also used for data.gov). Since each solution considered was open source software, the comparison included evaluating the health of the developer community. CKAN had more than 1,000 contributions on GitHub at the time, and has grown to more than 16,000 from 130 different developers. In the fall of 2013, a pre-release version was completed and demonstrated for a stakeholder feedback session. That session validated CKAN as the chosen solution.

The Commons has transitioned from a project to a program overseen by MnGeo, which coordinates stakeholder communication through the Minnesota Geospatial Advisory Council. Today, Minnesota citizens in need of geospatial resources about their state can go directly to one place for search and discovery: the Minnesota Geospatial Commons. The robust search function and ability to download resources in a multitude of formats greatly reduces the time the customer spends searching and acquiring the information they need. Since the creation of the Geospatial Commons, 17 agencies have published their information in the new site and several have shut down their original data discovery sites. This focuses the state's geospatial efforts into one space instead of many, reducing data acquisition time for users and empowering them to focus on value-added projects.

The goal of the Geospatial Commons project was to produce a coordinated, next-generation site that allowed organizations to publish metadata and data; and empower users to find, view and use data, web services and applications. This goal was achieved when the site officially launched in March 2015. The use of geospatial information grows in importance nearly every day. By having one place in Minnesota to add and access this data, everyone benefits from this rich data – and saves time and money in the process. By incorporating local government publishing partners as well as state agencies, the Commons has transformed the operations of both users and publishers of geospatial information in Minnesota.

Salesforce1 Platform: Accelerate App Dev with Huge ROI. [17]

Salesforce.com was at the center of one of the most disruptive transformations in the IT world in 35 years in 2014. The company's pioneering customer relationship management (CRM) applications proved the case for cloud computing, and the company has parlayed cloud CRM success into market leadership in the critical and emerging space of cloud application platforms.

In this white paper, IDC analyzes the experiences of several Salesforce1 Platform customers to quantify the business value typically achieved and identify how these organizations are coming to rely on it as their platform of choice.

Businesses are in a constant struggle to reduce costs and improve agility.

Salesforce1 Platform includes an IDE — which contains the tools to develop and refine code — plus a variety of other tools for building, sharing, testing, staging, and deploying code, along with prebuilt UI libraries, mobile optimization tools, and developer/business leader workflow and approvals.

Salesforce1 Platform includes the various services and capabilities, which combined, make the application development life cycle easier for developers.


In the area of Mobile Services, mobility has become a key focus for enterprise developers and creators of commercial applications in the salesforce.com ecosystem. Like the rest of the Salesforce1 Platform, the new Mobile Services are geared around rapid code development using rich platform data and orchestration resources. The toolkit includes a prebuilt Salesforce1 mobile app (a popular application for branding and mobile enablement that automatically includes custom apps); an open source mobile SDK for writing HTML5,

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[17] Salesforce1 Platform: Accelerate Application Development with Huge ROI, sponsored by Salesforce.com in February 2014. Retrieved from the NASCIO website in February 2018.

native salesforce.com, and hybrid apps for iOS and Android; out-of-the-box developer templates with the most popular JavaScript frameworks for both Web and hybrid apps; single sign-on and sophisticated federated identity management framework leveraging salesforce.com's recently announced Salesforce Identity Solutions; and a geolocation framework for building services that leverage and manage geospatial queries on mobile location, including context- and proximity-based searches.
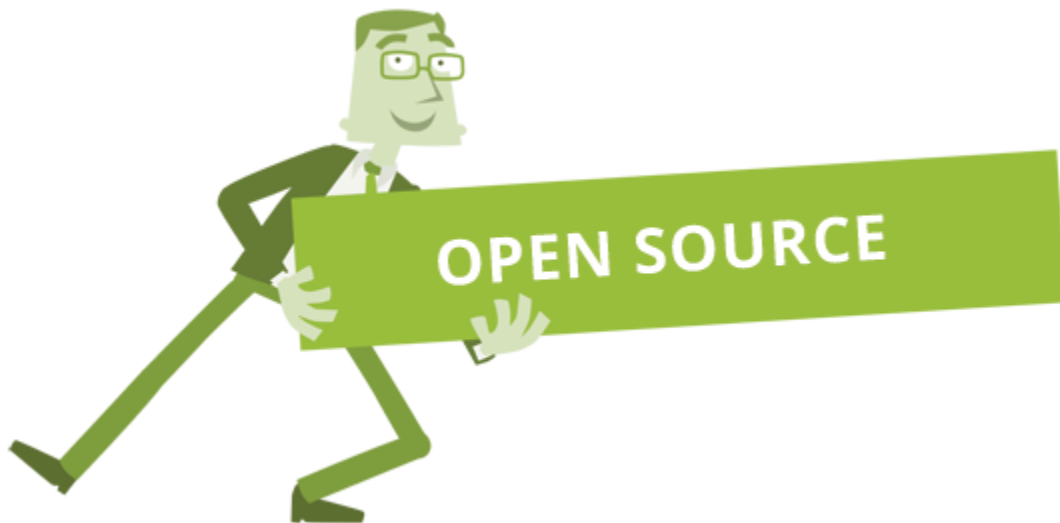
Medium.com Really Big List of Open Source Projects web page picture.