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Role of Central IT in Open Source Software Committee

TEAM MEMBERS

- **Trevor Jerue**, Co-Chair, Knowledge Manager, DoIT (*Chair*)
- **Matt McGrievy**, Co-Chair, Director of Web Development and Communications Core, Arnold School of Public Health (*Chair*)
- **Bob Brookshire**, Director of Graduate Studies/Professor,Integrated Information Technology
- **John Grego**, Department Chair and Professor, Statistics
- **Sean Sims**, Student Information Services Program Manager, DoIT

PROBLEM STATEMENT

There are a number of people using open source software (OSS) on campus, but the extent and type of packages are not well understood or documented. Categories of OSS in use on campus include programming languages, statistical software, content/learning management systems, operating systems, and other server-based software. An inventory specifically of OSS in use on campus, as well as a better understanding of user needs, would be helpful for connecting users and informing how support should be offered by DoIT. In addition, documenting what people currently use at USC could help to inform software licensing decisions if there are widely-used alternatives to commercial software. This committee aims to make recommendations on the following items:

- Collecting information on open source tools and support
- Creating a central support mechanism
- Evaluating enterprise licensing agreements and commercial software in light of OSS already being used and whether there are viable OSS replacements that could save on cost

INVESTIGATION METHODS/DATA/CONCLUSIONS

We sent a survey (*Appendix 1*) to all IT personnel listed at https://www.sc.edu/about/offices_and_divisions/division_of_information_technology/community/it_personnel/ asking them the following questions:

1. Please list any Open Source Software your unit routinely recommends, installs or supports for faculty and staff.
2. How do you provide support or training for Open Source Software?
3. What additional Open Source Software do you and your IT staff use in your daily work?
4. For which Open Source Software resources would you most like to see centralized support from DoIT?

5. Please list any Open Source Software which researchers in your unit request. How have you handled these requests? How do you support this software?

Of the approximately 36 offices listed therein, we received 17 responses, with one or two still pending. Of those 17 units that responded, six indicated that they used little to no open source software of any kind: HRSM, Journalism and Mass Communications, Medicine, Business, Music, Athletics. A couple of these emphasized that IT personnel use open source, but they neither recommend nor support it for faculty/staff.

Only a few units responded in depth. We await responses from a couple other units (University Libraries; Engineering and Computing), which should add depth to this report.

Most of the responses suggest that standard desktop support is provided for installing the package and insuring compatibility with the operating system and other software packages. Good faith efforts are provided for technical support, though users are typically referred to the application's website.

EXECUTIVE SUMMARY

When initially investigating the topic, the committee considered whether there would be a critical mass of OSS users on campus to necessitate a support mechanism from DoIT. In addition, we thought there might be particular packages, such as R or PDF editors that might serve to augment or replace expensive licensed software (SAS and Adobe Document Cloud respectively), but the survey responses did not bear that out.

Instead, the responses indicate that, while there's wide usage of OSS on all USC campuses, there isn't necessarily consensus on particular software packages. When we asked which software people used, respondents listed approximately 100 unique packages, including for example, Firefox, Apache Hadoop, Sun Grid Engine, and the Android SDK. The category of OSS has become so broad and encompasses so many different use cases that to try to target "OSS" as a support category likely wouldn't be feasible.

The approach that we suggest is for DoIT to help facilitate the formation of user groups that could support each other and perhaps grow communities around individual packages organically. Our primary recommendation is to create a listserv to encourage a Linux user group to form on campus and be able to support each other. Topics could include how-tos, security announcements, USC-specific configuration topics, and general user support discussions.

DoIT staff with an interest in OSS could join the listserv and be part of the community just as any other faculty, staff, or student on campus could join. This approach requires few resources and will hopefully foster the formation of a self-supporting community. The primary audience for the listserv will be for faculty and staff, however DoIT can promote either the listserv, specific open-source software events happening on-campus or nearby (e.g., Open Source 101), or both,

using student-centric locations such as the Carolina Tech Zone. While students will primarily be seeking help or information on non-OSS packages such as Microsoft Office or Windows/macOS operating systems, any effort DoIT can make to promote software offerings would be welcomed.

The listserv could also be used to promote the various open source conferences and meetups within the larger Columbia area and further engage USC with the larger community that's already present. For a university of USC's size, we should have a much more visible presence in the local OSS community - encouraging the formation of an on-campus group could be a key first step.

RECOMMENDATIONS/ACTIONS

Based on the responses received in the survey, the committee recommends that DoIT take modest steps to foster the OSS community on campus, but not actively allocate staff time or resources to officially support particular OSS.

1. Set up an OSS listserv and encourage those interested to sign up. The listserv would be focused first on Linux with the hope that it would grow to include other areas.
2. Identify faculty and staff on campus who have an interest in OSS: Application Services could help to reach out to network managers and other people known to be interested in OSS to encourage them to join and to contribute.
3. DoIT can promote OSS either on campus or through local OSS events. Suggested options would be lunch-and-learns for popular OSS packages, and representation at on-campus or nearby OSS events. To outreach to our student body, we can advertise OSS such as Linux through our Carolina Tech Zone.
4. DoIT can also link to various OSS packages through the Software Distribution website. This is the primary software purchasing portal for the University, and while DoIT would not centrally provide technical support for OSS, we can link to primary repositories in an effort to empower users to make the best decisions for their needs. DoIT would need to create an additional software category, as this software licensing is not restricted to "individual" or "university use" as is the model today.

APPENDIX 1

Open Source Survey Results

We asked the following questions of all IT personnel listed at https://www.sc.edu/about/offices_and_divisions/division_of_information_technology/community/it_personnel/. Of the approximately 36 offices listed therein, we received 17 responses, with one or two still pending.

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Responses to the other questions appear below, along with the frequency of each response in parentheses. The categories for Open Source Software were actually provided by one of the responding units, and we modified those categories to fit other responses we saw.

1. Please list any Open Source Software your unit routinely recommends, installs or supports for faculty and staff.

This question elicited the greatest variety of responses, as might be anticipated. Software related to the Linux operating system were popular responses, as well as the Open Source Software platform Apache, and familiar packages such as VLC, Firefox and Filezilla.

Operating Systems (OS)

- Android SDK
- CentOS (2)
- Fedora (2)
- Ubuntu (2)
- VirtualBox

Editors

- Atom
- Audacity (3)
- Avogadro
- Emacs
- GIMP (2)
- gVim
- ImageMagick
- LaTeX (TexLive, MikTex)
- Notepad++
- Vim

Web

- Django
- Drupal
- Firefox (6)
- Handshake
- Lamp
- Nagios
- Ngingx
- Pale Moon
- Tomcat
- WordPress
- Databases
- Constant Contact
- db browser for sqlite
- MariaDB
- MySQL (2)
- Network
- Open-ssh

Development Tools

- Android Studio
- Apache/Apache2 (4)
- Atlas
- BlueJ
- Caffe
- CSI Spectrum
- Cuda
- cygwin
- Eclipse (3)
- FFTW
- Gamess
- Gaussian
- GeoGebra
- Git (3)
- Grace
- Gradle
- Greenfoot
- Gromacs
- Guide on the Side
- HDF5
- IntelliJ Idea
- Java (OpenJava, Eclipse)
- JavaFX Scene Builder
- libsvm/liblinear
- Molden
- MonoDevelop
- NAMD
- NetBeans (2)
- Node
- Numpy
- OpenBabel
- OpenBlas
- OpenCV
- OpenMPI
- Processing (2)
- Python (3)
- Perl
- PHP (3)
- R (3)
- RStudio
- Ruby on Rail
- Spyder
- SUNDIALS
- Unity
- XAMPP (2)

Workplace Tools

- helpdesk
- LibreOffice
- MaxBulk Mailer
- Maxient
- OpenOffice (2)
- TimeClock
- TutorTrac
- WeBWorK
- 7zip

Visualization Tools

- Blender (2)
- Blender Player
- gimp2
- inkscape
- IQmol
- ParaView
- Thor Gaurd
- Visit
- VLC (4)
- VMD
- *Big data:*
- Apache Hadoop
- Cloudera
- *HPC*
- Sun Grid Engine
- Torque

FTP

- Filezilla (4)
- PuTTY (2)
- WinSCP

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Security

- Keepass
- Wireshark

2. How do you provide support or training for Open Source Software?

Most of the responses here suggest that standard desktop support is provided in installing the package and insuring compatibility with the operating system and other software packages. Good faith efforts are provided for technical support, though users are typically referred to the application's website.

USC Salkehatchie: When there is a request for a particular software, Salk IT will familiarize themselves with the software, learn it and either provide written instructions or a power point to the end user on how to use the software as well as provide one-on-one training with the end user.

University Housing: We install programs and instruct users in the basic features at the time of installation.

USC Aiken: Our support for FOSS desktop packages falls within the realm of standard desktop support; we ensure that it gets installed and configured correctly on the user's desktop and doesn't conflict with any other software packages. Ongoing maintenance includes ensuring the package is updated and also functions with new desktop OS deployments. If the user has an issue with the software, unless we are already aware of it and have a solution, we encourage them to communicate with that package's community support.

Support for most hosted FOSS packages falls under our "best effort" network services commitment. Unless we have a support contract for that package, we will conduct our own research and engage the package's community support in order to develop a solution to an issue. If a solution isn't available, we will work with the user(s) to either develop a work-around or recommend another software package which they can use.

Training for FOSS packages is typically limited to packages deployed as part of a project implementation. Users will be trained on the proper use of the package, typically some type of web portal, and will be provided additional training when requested, when staff turnover requires it, or when updates are installed. Training for FOSS packages generally does not occur outside of this context.

Arts and Sciences: Most of the open source software used in system admin support is not used by faculty and staff, so no training support is needed, other than for the tech, who generally gets support via the web. Software in student computer labs is minimal, but does include Audacity, GIMP, and OpenOffice. There is no training for these programs as they are fairly easy to navigate and mimic commercial versions of the same.

Student Affairs: We host some apps on local VMs. We assist with the setup of FTP for hosted solutions, when required. Training is usually handled within the department using the application. We sometimes assist with the selection of the 3rd party app. Other times, the

department selects the app, usually based on industry standard or what similar departments at other institutions are using. We prefer that they use vendor hosted solutions.

USC Beaufort: For desktop and server applications, used by Faculty and Staff, we provide basic support (e.g. installing, patching, and basic troubleshooting). If the application is used by IT Staff, they are responsible for high-level troubleshooting and issue resolution. If a resolution to an issue cannot be found, new software is acquired.

For Wordpress, our department maintains the server OS (Ubuntu) and the web server (apache). Wordpress is administered by one of our research librarians. When she wants a new feature, or has an issue, we have generally been able to help, but leave the more straightforward implementation up to them.

3. What additional Open Source Software do you and your IT staff use in your daily work?

The list here has some similarities to the list in Question 1, but many more utilities are listed, as may be expected.

Operating Systems
- Linux (Centos, Fedora, Ubuntu) (4)
- Sun Grid Engine
- Virtual Box

Development Tools
- Apache/Apache2 (4)
- Apache Tomcat
- FPDF
- Ghostscript
- MPlayer/MEncoder
- Ninite
- Python
- TortoiseSVN
- VisualSVN
- Wufoo
- Xamarin SDK
- ZXing.NET

Workplace Tools
- Freeradius
- OpenOffice
- Postfix
- SugarCRM
- 7Zip

Security/Monitoring
- Cacti
- Clonezilla
- fail2ban
- GLPi
- Graylo
- MRTG
- Nagios
- Pfsense
- RRDTool
- SecurityOnion
- Wireshark (3)

Web
- Drupal
- ElasticSearch
- PHP (2)
- Nginx
- NuSOAP
- WordPress
- *Databases*
- AutoMySQLbackup
- MongoDB
- MySQL (2)
- SQLite

FTP ● Filezilla (3) ● Tftpd/VSFTP *Editors* ● Audacity ● Notepad ++ *Visualization Tools* ● VLC Player ● Xibo	*Network Tools* ● Asterisk ● ISC DHCP ● ISC Bind9 ● Open-ssh ● Samba ● Tera Term ● TightVNC Client/Server ● VNC ● HPC ● Rocks ● Torque

4. For which Open Source Software resources would you most like to see centralized support from DoIT?

IT personnel listed only a limited number of resources for which they would need support. Based on the long-form responses, there may be interest in listservs or user-group communities so that open source expertise can be more widely shared.

Operating Systems ● CentOS ● Fedora ● Linux ● Ubuntu (Linux/Apache/MySQL/PHP) *Web* ● Drupal ● Firefox	*Security and Monitoring* ● Clonsezilla ● SecurityOnion ● Wireshark *FTP* ● Filezilla *Visualization* ● VLC

USC Aiken: Unless DoIT acquires a support contract for a particular FOSS package, there really isn't a need for this outside of the joint initiatives, like SecurityOnion, between Aiken and DoIT. Aiken has employed the use of FOSS in various, increasing capacities for the past 16 years, and has typically done so with positive outcomes. Rather than a centralized support offering, it would be more beneficial to have a collaborative support offering: formalize a system-wide FOSS group/committee, with representation across all campuses and departments, so we are all aware of who is using which packages and who has particular areas of expertise. FOSS is built upon communities and having a FOSS community at USC would be a great thing.

USC Beaufort: If we knew we had support for open source software, we would implement more open source projects, savings us tens or potentially hundreds of thousands of dollars in licensing costs. Without support, there is an element of FUD that pushes us toward proprietary (and supported) solutions.

5. Please list any Open Source Software which researchers in your unit request. How have you handled these requests? How do you support this software?

Arts and Sciences: For open source software researchers have requested, please refer to answers to question 1.

Upon receiving these open source software requests, the Research Computing Center collects information about these requests: e.g. the correlated projects, the time of software usage, computing system requirement, training and level of supports, etc. It is clearly stated to the researchers that all software has to follow university and state policies and comply with available in-house support. Then software is installed, and software license rules are followed. Initial training is provided when necessary. The newly installed software is added to the support list.
For training, three types of trainings are provided: a) in-class training at the beginning of each semester; b) one-to-one hands-on training when necessary; and c) training sessions by USC or other institutes/communities.

For support, the Research Computing Center provides the same level of support as that of commercial software. A number of testing environments have been set up in house to insure stability and compatibility of sw. New software releases are monitored in Github and development communities. Initial software installation and system integration are performed as required. Major software, e.g. OS, are upgraded once in a month and major releases are applied once in a year. Emergency fixes are applied in a day or two. Researchers are notified on major releases of developing tools and new versions as required. Environment modules are used to manage multiple versions of development tools. Response time is within 4 hours, and resolving time is usually within one or two weeks. Communication between users and us is by email and phone. There is no charge for supporting Open Source Software.

USC Beaufort: We do not know what specific software users have installed on their research systems.