Ideas for Advancing Code Sharing (A Different Kind of Hack Day)

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Abstract.

How do we as a community encourage the reuse of software for telescope operations, data processing, and calibration? How can we support making codes used in research available for others to examine? Continuing the discussion from last year Bring out your codes! BoF session, participants separated into groups to brainstorm ideas to mitigate factors which inhibit code sharing and nurture those which encourage code sharing. The BoF concluded with the sharing of ideas that arose from the brainstorming sessions and a brief summary by the moderator.

1. Introduction

This Birds of a Feather (BoF) session was held to gather and discuss ideas on how to encourage the reuse of astronomical software, make computational research methods discoverable, remove barriers to code sharing, and better recognize and reward those who write software that enable science and enrich our community’s efforts. This BoF builds directly on previous discussions \cite{Allen et al. 2013} and presentations \cite{Teuben et al. 2012}. Participants broke into groups for two brainstorming sessions; the following questions were prepared ahead of time to facilitate discussion:

1. \textit{How do we encourage release even if the code is “messy”?}
2. How do we reduce expectations of support when software authors don’t want to support software and still encourage code release?

3. How can universities be persuaded to change policies which prohibit software publication?

4. What can we do to encourage citations for codes?

5. Beyond citations, what can we do to give authors recognition for writing and releasing their software?

6. How can we measure the impact of a code on research and its value to the community?

7. What roles might journal publishers and funding agencies have in furthering code release, and how can the community influence them to take on that role?

8. What else can we do to have software release recognized as an essential part of research reproducibility?

The question on recognition beyond citations (5) did not gather enough interest and was dropped. Participants were also free to pose their own questions; what tools are available for sharing code? was suggested by Wil O’Mullane and discussed. Attendees were free to join any group and to move to another question for the second brainstorming period; a scribe in each group captured ideas. Throughout both discussions, moderator Peter Teuben moved among the groups to follow some of the brainstorming, and Nuria Lorente did the same and tweeted out points being brought up in the conversations. She also monitored the hashtags used for this session (#adass2013 and #asclnet) to gather input from people not present who were following the Twitter feed. After the brainstorming sessions, Teuben moderated the presentation of the results and general discussion.

2. Summary of Findings from the Group Discussions

Convincing people to release software even if code is “messy” (1) was the most popular topic. Suggestions for mitigating this barrier to code release included not allowing negative feedback on codes, offering a reward for codes that are used even if they are messy, using GitHub to store and exchange codes as a community practice to inspiring pieces of code, just putting them out there, and running software as a web solution to take pressure from the developer to fix code in a standalone pre-boxed solution.

Those who discussed how to reduce possible expectations of support when software authors release software they don’t want to support (2) suggested support be provided by the code’s user community by using forums such as stackoverflow and astrobabel. One caveat to this was mentioned: that a code may not have enough users to make this a useful method for its support. Someone opined that releasing a code through a public repository such as GitHub is “not really a release”; the term “GitHub mess” was used to describe such a release. This was countered by a tweet stating “that statement is completely flipped on its head by stuff like @astropy, github IS THE support vehicle.” Despite the “GitHub mess” comment, the group recognized that tools such as GitHub and public repositories make it easier to enable that kind of
support for a code, thereby providing some relief to the author of that expectation. Also mentioned by one of the two discussion groups was whether the Astrophysics Source Code Library (ASCL\footnote{www.ascl.net}) should have metadata describing level of support associated with entries, such as “gold”, “bronze” and “dirt”.

In dealing with universities and code release (3), common practice is to write and release code without regard to intellectual property policies. A suggestion was to make sure code authors understand the licenses and ramifications of each before talking with the university attorneys; they should go into the discussion forearmed with knowledge. Using NASA, NSF, or public funding requirements could also be used as justification for release, as can pointing to existing software released under a General Public License (GPL). A desire for a class on licensing, perhaps at a future ADASS, was expressed.

The topic of recognition for authors who release codes focused primarily on citations (4); participants suggested software authors include information on how their codes should be cited right on the software’s website, and that citing the software’s descriptive paper is almost always the right thing to do. Citing ADASS publications, which may be the only papers available for some codes, and standing up for one’s work and requesting it be cited were also discussed. It was pointed out no standard practice exists, and perhaps a manifesto on software citation, best practices, and policies should be developed (e.g., Wilson et al\cite{wilson2012}). Other suggestions included making sure one’s code is reflected in ASCL and ADS so it is citable and writing a paper in a journal that accepts software and infrastructure.

Both groups who tackled measuring the impact and value of codes (6) suggested the number of downloads could be used to determine a code’s value, though further observed that using the number of users or downloads as a measure can be tricky, since one download may be shared with lots of others. Repeated downloads by a particular user or users would indicate that there is greater traction for the code, that the download was more than a failed first attempt, and code still being downloaded years after release also indicates the community values it. Another suggestion was to try to determine the percentage of use in the community by looking at the potential audience for the code and ascertain the level of use within that potential audience; a small audience for a code but with full saturation means the software has great impact. Citations do not necessarily measure impact nor use, and measuring the kind of and level of impact a code may have, which could include scientific, social, breakthrough, or a break down of barriers to get to the next level of productivity or use, is difficult. Conducting a survey and rating codes were also suggested.

Discussion participants said funding agencies could clarify requirements and policies (7); they further suggested funders should realize that making code available is not free, and that if agencies require software sharing, they should be prepared to pay for it. Sharing code as an element of documentation of research is important; put bluntly, “if your code is your science, then you are not publishing your science unless you are publishing your code.” Sharing code with a guarantee of support to ensure reproducibility is asking too much. A question was raised that if there were an absolute requirement on publication of code which ran against organizational policy, would federal funding policies force institutional policies to change?

Having a common place already established to store code may make it easier for code authors to release their work, which may help with having software recognized as
an essential part of research reproducibility (8). A desire for a site similar to GitHub but static, where code can follow you wherever you go, was expressed. The lack of good coding practices needs to be addressed, opined one group, before a code can be recognized, and schooling grad students in recommended software practices or requiring computer science courses may help with this. Participants suggested coders should be encouraged to advertise that their code is publicly available; a counterpoint was made that some say their code is available, but it is difficult to get to. This was expressed as “Saying code is publicly available but ignoring requests for it, putting it somewhere obscure, etc., is NOT code sharing.” Another suggestion was to make licensing requirements more transparent: if one works for an institute, it can be quite difficult to figure out what licensing requirements are.

GitHub was suggested as a primary tool for sharing software, though one participant in these discussions uses SourceForge for his codes. Having an astronomy area with endorsements would be helpful, as would more education on software practices, such as that provided by Software Carpentry.

Documents provided by the scribes for the brainstorming sessions that capture the discussions more completely are available online.

3. Conclusions

In the familiar list of inhibiting factors, no major shifts in solutions were found. Several times issues around better educating our community came up, through forums, as well as a paper on recommended software practices. It is clear to these authors that the ASCL can play a role in endorsing and contributing to software sharing in the community.

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