LabTools: An integrated web-based framework for the publication of neuro-scientific data

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The biological sciences in general and the neuroscientific communities in particular are confronted with an increasing need to organize and selectively publish vast amounts of data. Here we present a software tool that we develop to support the sharing of data from research laboratories through the web.

The software runs on all platforms where Python (a powerful scripting language) is available, i.e., Windows, Mac, Linux, and any Unix variant. It enables fine grained control about who is allowed to access and manipulate standard information (who did what when and where) as well as experimentally gained original data using web techology. It does so by providing a so called 'workflow tool' that allows site managers to define states (like 'private', 'group visible', 'published') associated to individual object types (like 'data sets'). It is then possible to define who is allowed to view or edit an object depending on this state (e.g., 'group visible' may be set to allow other members of the laboratory to view the data). Furthermore, site managers can define transitions between states including permission settings to control who is able to invoke which transitions. That way the individual researcher (or head of the laboratory) can control in detail who is allowed to access which particular object and these rights can easily be changed as needed.

This solves one of the most prominent current problems in data sharing via the web in that it enables individual laboratories to make their data accessible through the web in principle but without loosing detailed control about who is able to view or download which data.

It does so by adding appropriate content types and methods to an advanced, open source content management system (see below). Even though the support of publishing experimental data is the main focus of LabTools, it can also be used to manage the entire web presence of a research group or institute.

Care is taken to be as standards compliant as possible with respect to interoperability issues. This includes technical aspects like supported protocols to interact with the site (currently HTTP, FTP, SMTP, XML-RPC, and WebDAV) or languages understood (both ways, like HTML, XML, RSS - for news feeds) as well as some more semantic features, like the support of the Dublin Core meta data standard.

If desired, the software can be configured to enable the submission of descriptive meta data about indivdual content items to the neuroinfomatics portal at http://www.neuroinf.de.

Technically, LabTools are a realization of a customized framework on top of Zope (http://www.zope.org), a general object publishing environment, its content management framework (CMF; http://cmf.zope.org) and Plone (http://plone.org), the most advanced front end to the CMF. LabTools can be obtained free of charge and they are distributed under an open source license (as are Zope, CMF, and Plone). The most up-to-date information about this project can be obtained from
http://www.neuroinf.de/Members/ritz/LabTools.

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Note to the reviewer: The release plan for LabTools is to have an alpha version out by the end of March, a beta release by early June, and the first release later this summer (hopefully enhanced through constructive feedback at the meeting). An example site where LabTools are used (and developed) can be accessed at http://planck.biologie.hu-berlin.de:8090/itb