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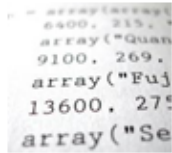
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Open Source Software

Open source is frequently cited as one of the most important movements in modern software creation. It is supported by the European Commission, the UK government and JISC, and almost every higher education institution makes use of open source software. This introduction is adapted from a JISC Briefing Paper written by [OSS Watch](#), a JISC-funded advisory service on open source. This introduction covers what the term 'open source' means; what the most common licences are; what the impact is on the education sector and where you can get more information.

What is Open Source Software?

'Open source' describes computer software for which:

- The source code is available to the end-user
- The source code can be modified by the end-user
- There are no restrictions on redistribution or use
- The licensing conditions are intended to facilitate continued re-use and wide availability of the software, in both commercial and non-commercial contexts

In every other respect there is no difference between this and conventionally-licensed software. The key differentiator is the licence. The term 'open source' is reserved for licences which are certified by the [Open Source Initiative \(OSI\)](#) to meet the criteria of the [Open Source Definition \(OSD\)](#).

There are several other features which many, but not all, open source software products have in common:

- The cost of immediate acquisition to the end-user is usually minimal; this is because the right to freely redistribute the software makes selling licences for copies of open source software an unlikely business proposition
- The development methodology of open source projects shares many characteristics with Agile programming, in that releases are frequent, features are added quickly after customer feedback, developers are often distributed geographically, and formal management structures are limited
- Many, but by no means all, open source projects are created and sustained by informal communities of developers, users and evangelists, rather than commercial companies
- Open source projects often serve as apprentice opportunities for junior developers to rapidly learn their trade by engaging in real-world development

It is important to understand that software which is developed by big companies such as IBM, Novell or Sun using conventional methods is being released under an open source licence just as effectively as that developed by a loose-knit community of graduate students working at night to improve their programming skills.

Open Source Licences

At the moment there are more than 50 OSI certified open source licences. The following five are perhaps the most commonly used:

- [The GNU General Public Licence \(GPL\)](#)
- [The GNU Lesser General Public Licence \(LGPL\)](#)
- [Modified BSD \(Berkeley Software Distribution\) Licence \(new BSD\)](#)
- [Apache Licence](#)
- [Mozilla Public Licence \(MPL\)](#)

The difference between them is the extent to which they control the way the code can be combined with other software. At the one extreme, the BSD licence permits open source software to be merged with closed–source code and then sold under a conventional licence. At the other, the GPL licence insists that if the software is combined with other code then that too must be under a GPL licence. The decision as to which open source licence to use on a new software project should not be taken lightly. In many ways it expresses and shapes the development goals of the project.

Open Source use in HE institutions

Open source software is already in use in most UK universities, whether in the context of mail servers, teaching systems, scientific workstations, or student desktops. It is, however, not yet usually part of an institutional strategy.

Interoperability is the principal reason cited by HE institutions for considering the deployment of open source software. This is because open source development tends to support open standards. The JISC–funded [CETIS](#) (Centre for Educational Technology Interoperability Standards) service represents UK Higher and Further Education on international educational standards initiatives. Additional factors that can give open source deployments an advantage in HE institutions are:

- No licence surprises. Open source licences are free and perpetual, so a licence fee increase cannot happen
- No incentive for theft. There is pressure on students to have course software available at home, and this can lead to theft. With open source software students can use the software legally
- The lack of secrets. The working of the software is available for anyone to inspect, something of great importance for security auditing
- The ability to tailor the system completely to local needs. Both open and proprietary software are typically customisable in a shallow sense – institutions can tailor the interface within the bounds given by the programmers. With open source, if an institution needs the software customised in ways not thought of by the programmers, they can have the program changed, either in–house or by a third party.

Open Source Deployment and Support

UK government studies show that open source software can, in some instances, be cheaper to maintain than proprietary software. Deployment of open source software should follow the same pattern of evaluation of needs, testing, acquisition from a supplier and so on as would be used with proprietary software. However, there are two additional factors to consider:

- There can be multiple, independent, primary vendors of open source software to choose between
- As well as the usual range of support options (relying on a primary vendor, dealing with a large general support company, employing a specialised consultancy, and developing in–house expertise), there is the additional possibility of bringing development of new features in–house.

The cost of deploying and supporting software, whether open source or closed source, is very often much higher than the simple cost of licence acquisition, and will often be the principal component of the total cost of ownership.

Open Source as an Exploitation Model

HE institutions regularly engage in software development, and sometimes exploit the result by setting up a company to sell licences. There are also business models that have been demonstrated to successfully work with open source licensing and development methodologies. Sometimes this involves dual licensing, an approach which is only viable when the institution controls all of the intellectual property rights (IPR) in the software. The MySQL database is a good example of dual–licensing in the commercial world, and LAMS is a good example in the academic world. Shared development through the creation of consortia, as in the uPortal project, is another successful model.

Open source exploitation models are relatively new to HE knowledge transfer units. Finding a model that is right for a particular institution will take some effort. It is likely that institutions will want to take advantage of a portfolio of different open source licences for different types of project. Sometimes, for example, only part of a software development will be released as open source, while another part may be exploited using conventional licensing – this will have an impact on the type of licence chosen.

Open source exploitation should be a component in any institution's IPR exploitation policy.

HE institutions also need to consider how their staff participate in ongoing open source development. Institutions that deploy open source software in their infrastructure need to make clear how staff can contribute software code patches, for example, legally to the ongoing development of the software. Such contributions are not merely good open source practice – there are also clear advantages in terms of continuing professional development for staff, and enhancing the reputation of the institution.

Common Misunderstandings about Open Source

Open source software is often confused with other software whose minimal cost of acquisition makes it appear similar:

- Software which follows the open source guidance, but whose licence has not been accepted by the OSI: open source is not achieved by self–certification
- Software released with source under special conditions, such as not allowing commercial use; this contravenes one of the fundamental criteria of the OSD
- Software which can be freely redistributed, but without source, or the right to modify or redistribute it; again, such software does not have an open source licence.

In addition, it is a common myth that 'open source equals no cost'. Apart from the obvious costs of technical support/development staff, open source software incurs many of the same categories of cost as that of developing in–house or implementing commercial products, this may still include licensing and maintenance elements although these will usually be lower than their commercial counterparts. As the sector progresses towards 'community source' software – inter–institutional collaborative development of software tools and systems – there is a real hope that this may lessen the total cost of ownership, as products are more tailored to educational needs and/or more flexibly manipulated, rather than incurring the high costs of customised, clumsy 'bolt–ons' to commercial

products that are ill-fitting to FE and HE needs. The University of Strathclyde have provided a [guide](#) to investing in such software and services.

Open Source Software – Resources

OSS Watch is a JISC-funded advisory service on open source; the website provides many resources, including briefing notes, studies, reusable teaching material and a forum for discussion.
<http://www.oss-watch.ac.uk/>

The Open Source Initiative provides full details of open source licences; the Open Source Definition is also maintained by the OSI.
<http://www.opensource.org/>
<http://www.opensource.org/docs/definition.html>

The Free Software Foundation is a more overtly political group promoting the free use of all software.
<http://www.fsf.org/>

The UK Government published a policy on Open Source in November 2004, which sets out guidance for exploitation of publicly-funded software development. This is expanded upon by the forthcoming JISC policy.
http://www.govtalk.gov.uk/policydocs/consult_subject_document.asp?docnum=905

The Australian Government Information Management Office have published a useful Guide to Open Source Software for Australian Government Agencies. It contains detailed advice on administrative and managerial aspects of open source software.
<http://www.sourceit.gov.au/sourceit/oss>

There has been a great deal of study of open source methodology, and it is the subject of current funding by the EU, details of which can be found at:
<http://www.flosspols.org/>

A large amount of open source software is available to meet most needs. For desktop use, a mature selection of programs to run under Windows is available on TheOpenCD:
<http://www.theopencd.org/>

Ubuntu provides a robust and well-integrated Linux environment:
<http://www.ubuntu.com/>

Firefox is one of the best web browsers available:
<http://www.mozilla.org/products/firefox/>

OpenOffice is a major office suite, made open source by Sun Microsystems:
<http://www.openoffice.org/>

In educational circles, the Learning Activity Management System (LAMS) is an innovative project for online learning, developed by Macquarie University under a dual–licensing model
<http://www.lamsinternational.com/>

Moodle is a very popular virtual learning environment (VLE) with an admirable community ethos.
<http://moodle.org/>

There have been many other successful open source projects in higher education. uPortal is a standards–compliant portal framework developed by a consortium of top US universities with UK participation.
<http://www.uportal.org/>

In the UK, JISC has funded the e–Prints project for institutional repositories, and the Reload SCORM editor and player.
<http://software.eprints.org/>
<http://www.reload.ac.uk/>

In management of web and mail servers, the use of the Linux operating system is very common, as are the Perl and PHP scripting languages.
<http://www.linux.org/>
<http://www.perl.org/>
<http://www.php.net/>

Future Open Source Learning Environments

The Higher Education Academy's '[Open Source VLEs: the next generation](#)' event was held at York St John's College on 14th December 2005 as part of their [Innovations](#) theme.

[Discussion notes](#) from the workshop hosted jointly by JISC infoNet and OSS Watch are available as well as a [resource list](#) compiled for delegates based on issues raised in these discussions.

A repeat of the event will be held in Cambridge on Thursday 29th June 2006. Further details and booking links will be available shortly from our events page.



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