

Discussion of *The relevance of Open Source to Hydroinformatics* by Hamish Harvey and Dawei Han, 2002
***J. Hydroinf.* 4(4), 219–234**

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The authors have to be congratulated on a truly excellent paper describing the relevance of the Open Source movement to hydroinformatics. It is clearly understood, and indeed taken as given, that this movement would be impossible without the prior existence of the Internet. The subject of this paper is so important to hydroinformatics, however, not only for explaining the potential of developments in the Open Source movement to date, but for the perspectives that it opens up when these developments are combined with another stream of development, which is that of a further ongoing revolution in communications technologies and their associated sociotechnologies. This second stream of development is also closely associated with the use of the Internet, but in a different way and for a different purpose, being directed to making the productions of such groups as those pioneered by the Open Source movement much more widely available within society as a whole. This second stream is thus associated more with the use of advanced software systems by persons and organisations that know little or nothing of the software itself, but are only concerned to use this software for their own purposes. In the parlance of postmodernism, these are ‘consumers of knowledges’ of a wide variety of kinds rather than ‘knowers’ of these knowledges. This second stream of development is then so important specifically in hydroinformatics because hydroinformatics knits together strands of so many different kinds of sciences and technologies and applies its resulting productions in so many different ways. The different knowledges that must then be brought into play must then be distributed over many individuals and organisations, both on the supply side, as this is being transformed by Open

Source systems, and on the demand side, which is also on its way to being transformed by Internet-distributed hydroinformatics systems. It is these *knowledges* that can best cooperate (or, to use the technically more appropriate expression, ‘conjoin’) through introducing specific varieties of Open Source arrangements, while at the same time the productions resulting from these conjunctions can best be accessed and knitted together for social applications through this second set of conjunctions that are being pursued in hydroinformatics (see, for example, Abbott (2003) and Anh & Abbott (2003)). Thus, to express this simplistically, and even technocratically, what Linux is to the Open Source movement in computing, Java is to the movement in communication in this more extended sense. It may well be that the conjunction of these two movements—and indeed ‘*the conjunction of these two knowledges of how to use conjunctions of knowledges*’—will open the way forward to a new paradigm in hydroinformatics practice, and thus, inseparably, to new business arrangements.

In this paradigm, it becomes possible to produce the different components of hydroinformatics systems by those who can best produce them, where ‘best’ is decided, as the authors explain, by the reception of their productions by the enviroing, communicating, hydroinformatics community. The current academic and professional business environments appear to necessitate that, for a large part, the producers of the various individual components and complexes of components will have to charge for the use of these components. The components, together with their owners/creators, can then be expected to be connected together through an intranet. This will in

turn be accessible through an extranet whereby users will be able to select and combine components to suit their own particular applications. This extranet will provide the facilities to estimate and charge for the individual applications as well as to provide the user interfaces necessary for the individual users to configure the various components that they need to instantiate over the extranet for each application. The system will be open to any supplier deemed 'serious' in the manner outlined by the authors in their paper.

It is, however, important to observe in this respect that all social and sociotechnical organisations have both a formal structure, which we may call an *exostructure*, which is an authoritarian one with designated, predetermined and even preordained lines of authority, defining what is predominantly a power structure, and an informal, nonauthoritarian but persuasive structure, which we may call an *endostructure*, which expresses lines of communication, defining what is predominantly a knowledge structure. These two structures may, in some cases, work in tandem and in exceptional cases be one and the same, with positive consequences for the organisation, but they may—and nowadays increasingly do—come into conflict. The source of this conflict can be traced back to changes in knowledge/power relations of a sociotechnical nature occurring in society as a whole. The Open Source movement is but one consequence—albeit one of the most significant to us—of this conflict between authoritarian and nonauthoritarian structures. In the event that the nonauthoritarian movement comes to presence in an environment already occupied by authoritarian organisations, we may follow Foucault (1972–1977/1980) in speaking of an *insurrection of a repressed knowledge* (see also Abbott 2003).

Endostructural arrangements of the Open Source kind, which we can continue to call 'systems' for convenience, are, in the strict sense of the word, 'anarchic', which puts them in much the same category as chaotic systems in physics. We can provisionally place them in the same category because both are systems which evolve their own structures rather than having structures imposed upon them by their environments. Such structures are, in both contexts, said to be *emergent* and their scientific study falls, for the moment at least, largely under

the aegis of chaos theory (see, for example, Kauffman (1993), Lorenz (1995) and Ruelle (1993); see also, within the sociotechnical context, Abbott (2001) and Abbott & Jonoski (2001)).

In order to view this category more clearly, we may recall the three principal components of all anarchistic movements, namely those of *mutualism* between participants (the recognition of mutual interests and the provision of mutual support), of *federalism* (the formation of a federal structure between the groups of participants, such as may be provided by the structure of a syndicate) and of *direct action* (the direct involvement of this federation/syndicate in processes occurring in society and in the world of nature). Human-rights movements, animal-rights movements, 'ecological' or 'green' movements, peace movements, nongovernmental organisations and many others provide familiar contemporary examples. A now classical delineation of the four principal stages in the formation of such movements was provided by Callon (1986).

In their paper the authors very rightly emphasise the critical importance of a shared *ethic* in any such movements. Now, among most so-called 'higher animals'—those with endoskeletons and highly developed nervous systems—codes of social behaviour which approximate ethics are inculcated for a large part by the playing of games, and of course this applies to human societies as well. Current research into the means to inculcate ethical norms in the sociotechnical systems that are now being advanced in hydroinformatics accordingly attach great importance to inducing habits of secondary reflection and other promoters of intersubjectivity by introducing internet-based games into these systems (e.g. Jonoski 2002). Now the essential point about the Open Source developments described by the authors of this paper, such as the development of the GNU/Linux operating system, is that *such a development is itself a game, with all of its participants functioning as players*. Thus the ethics necessary to support such a mode of development are self-generating and self-sustaining.

Now, of course, much is made in histories of the vulnerability of anarchistic movements and of how they have been repeatedly destroyed by authoritarian

ideologies, with their quite other kinds of social bodies and institutions. However, this presumption is not warranted in principle, and indeed can only be sustained for situations in which the authoritarian power possessed advantages in communications as well as in naked physical force. For example, the traditional European university system, which satisfied all three determinants of an anarchistic system, endured from the second half of the twelfth century until the second half of the twentieth century, and indeed it still survives in some places even today. We should moreover recall that the name of 'university' was originally coined precisely in order to express the mutualist and federalist aspects whereby staff and students from several countries with differing cultures and natural languages came together for the direct action of study under equitable conditions.

The conclusions of the paper are inescapable, but could be made stronger still by returning to the essentially anarchosyndicalist nature of such developments, from which it is clear that such a development is nowadays not only desirable, but is probably becoming essential. It is increasingly commonly observed that the existing structures in education, research, consulting and elsewhere that have emerged naturally, of their own accord so to speak, as endostructures, are now having successive layers of exostructure imposed upon them by a variety of authoritarian bodies (e.g. Cunge & Van der Beken 2003). These bodies attempt to justify their actions, like all authoritarian structures do and always have done, by appealing to one or another ideology, but in every instance, as Foucault and his successors have explained within so many contexts, the motivation is usually just as much that of personal advancement and aggrandisement. Each failure occasioned by the one exostructure then only provides the excuse to superimpose another exostructure again. In his afterword to Foucault (1972–1977/1980, p. 250), Gordon observed that, quite generally, 'Failure here is the norm'. This is brutally apparent nowadays in most places at the level of university education, but in fact applies not only at that level but at all levels of education and, as just explicated, in many other places besides education. In the words of HRH The Prince of Wales (2002), writing of the situation in the UK:

'Ever since the 1960s in particular, we have witnessed a never-ending series of experiments with a well-tried system of education. Instead of gradual improvements we have been forced to observe the testing to destruction of a whole range of ideological theories that have helped to cause untold confusion in the entire outlook of at least two generations. By the time many of these experiments have finally been declared a very expensive and wasteful mistake, it will take another thirty years to repair the damage.'

Closely associated with these destructive forces is another again, which is the propensity of successive layers of authoritarian power structures to generate successive layers of bureaucracies. Quite apart from the waste of resources that these introduce directly, there is the all too familiar experience of the wastage of time and effort that they impose upon the otherwise productive elements in an organisation. On the other hand, anarchosyndicalist structures have been most remarkable historically precisely for their ability to avoid the accumulation of bureaucratic superstructures. The most cited example is that of the Spanish Confederacion Nacional del Trabajo, which had 2,000,000 members in the late 1930s while employing only one paid secretary!

Thus, what now begins to appear as a possibility—albeit as just one possibility of its kind among many others in society generally—is that the kind of anarchistic movement exemplified by the Open Source movement could be replicated elsewhere so as to confound the machinations of the powermongers who are nowadays doing such immense damage, and then not only within the computational and communicational domains, but in applications in areas like hydroinformatics and its foundations in education and research.

As concerns the realisation of these wider ambitions, it does seem that the time is becoming opportune for such initiatives (e.g. Anh & Abbott 2003; Thein & Abbott 2003). A relatively modest investment placed in capable hands could already set this process in motion. To use a familiar allegory (Oehlenschlaeger 1805/1854), all that is needed is for another, latter-day, Aladdin to release the Genie of technical and sociotechnical innovation and creative activity, including business activity, from the constraints within which the powermongers, the Nouredins of our times, try to confine him for their own nefarious purposes. This would indeed initiate a new era in hydroinformatics.

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