
Strategies and Technologies of Sharing in Contributor-Run Archives

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ABSTRACT

While we argue about and discuss the plusses and minuses of contributor-run archives, groups formed by people of shared interests and of varied technical competencies have been creating, maintaining, sustaining, and growing their archives for over a decade in several cases. These contributor-run archives make use of powerful open technologies to facilitate their projects. In this article I will focus on three different volunteer-run projects that involve worldwide cooperation using advanced technologies to further their ends. The Linux Documentation Project, the Degree Confluence Project, and Etree.org are all large projects that involve many contributors with technical teams of various sizes using a variety of technologies. Each project will be described in terms of its aims; its history; its rules, or lack thereof, for contribution; its technologies; and its current state of practice. From these examples we can draw some lessons as well as some enhanced awareness of technologies of cooperation. Among the technologies used by the projects are wiki, mailman, Shorten (SHN), FLAC, PHP, MySQL, PHPbb, Postnuke, BitTorrent, rsync, XML, and CVS. All of these technologies are “open” and available for installation, customization, and further sharing of their code.

Over my dozen years as director of ibiblio.org and its predecessors, sunsite.unc.edu and metalab.unc.edu, I have seen many projects flourish and many projects stagnate and more than a few projects die completely. At the time of this writing, ibiblio.org hosts and facilitates over 1,500 projects in addition to our extensive software collections. In May of 2001 I published

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a brief article describing how open-source tools might be used in contributor-run libraries (Jones, 2001, pp. 45–46). For this article I aim to describe some successful examples of open-source contributor-run collections. I have selected three projects with worldwide contributor bases, innovative technology use, open management, and volunteer staff for consideration. All three projects solicit participation from their users, and amazingly they have consistently received reliable and enthusiastic contributions. As a result, each is—within its particular area—a must-visit resource.

Briefly, the Linux Documentation Project aims to provide reliable, accurate, and helpful documentation to Linux users from beginners to advanced systems administrators in every language in the world. The Degree Confluence Project aims to document the world by visiting every degree confluence on the earth. A degree confluence is defined as “the exact spot where an integer degree of latitude and an integer degree of longitude meet.” Confluence.org volunteers participate in creating a database of photographs and narrative descriptions of their visits to each degree confluence on, or near, dry land on the entire earth. Etree.org aims to provide a forum for the exchange of very high-quality concert recordings of “tape friendly” bands (Etree.org, 2004e).

Each of these projects has an education component as part of its mission—that is to say, guidelines and FAQs for new contributors and new users. These educational components also serve to advance the ideology of sharing the information, skills, and experience that is a part of each project.

THE LINUX DOCUMENTATION PROJECT

The Linux Documentation Project (2004), begun by Matt Welsh in 1992 not long after the first wide release of Linux itself, predates the World Wide Web (Garrels, 2004; M. Garrels, personal communication, May 14, 2004). The goal of the project, as described by volunteer David Lawyer in the Linux Documentation Manifesto, is “to create the canonical set of free Linux documentation. While online (and downloadable) documentation can be frequently updated in order to stay on top of the many changes in the Linux world, we also like to see the same docs included on CDs and printed in books” (Lawyer, 2000). Thus, while the Linux Documentation Project can be seen as a long-lived online community project, its goals are not limited to cyberspace; the project aims for world conquest—or at least to conquer the world of Linux Documentation. To a large extent, TLDP—as it is now known—has succeeded. Andy Oram of O’Reilly and Associates, a leading technology publishing company that might be considered to be the competitor of TLDP, has written that TLDP “is an impressive organization that has editors, guidelines for reviewers, procedures for updating documents, translators—in short, it’s an organization that has tried to reproduce everything about conventional publishers, but in an open and volunteer

manner” (Oram, 2004). Oram also praises TLDP as “a phenomenon we should all be following as a model for documentation in an open source community” (Oram, 2004). I would note that an organization of a dozen years is no longer a phenomenon but is, in the world of cyberspace, an institution.

Those wishing to contribute documents to TLDP are pointed to a detailed yet straightforward Author’s Guide that describes what and how to participate. The process goes as one might expect from any publishing company:

1. Become familiar with the Linux Documentation Project’s other works by looking over the site and joining the Discuss mailing list.
2. After having identified a gap in the documents or that a new document is needed, propose your document to the Discuss mailing list, including if possible an outline and description of the document.
3. Write your document.
4. Mark up your document or seek help in doing mark up. All documents published by TLDP are in SGML, Docbook XML, or LinuxDoc formats to allow for flexible republication. Obviously, this might constitute a high barrier of entry for contributing writers, but TLDP volunteers have agreed to work with new contributors by instructing or even providing proper markup for submitted documents (Sundaram, 2003).
5. Submit your document for review by sending a copy or a link to a copy to the Submit mailing list. A language editor, a technical editor, and a metadata editor review all documents. It is not unusual for all three editors to actually be the same person. This process could take up to two weeks. Of particular note to readers of *Library Trends* is the requirement that eleven metadata fields be complete and accurate before a document is accepted. Metadata editor Emma Jane Hogbin writes that the goal is for TLDP documents to be Open Archive Initiative–compliant within the year (E. J. Hogbin, personal communication, May 12, 2004).
6. After, or even during, the review process, the document is added to the Concurrent Version System (CVS) for TLDP. While the use of CVS is optional, it is a great innovation. CVS allows an author to keep an offsite copy of the document as well as allowing other authors or editors to make traceable changes in the document. Additionally, the change log may be included in the document automatically as an aid to readers. Ideally in the future, the change log will also interact with the appropriate metadata elements and will be used to announce the new or newly revised document to the TLDP Web site and appropriate lists (E. J. Hogbin, personal communication, May 12, 2004).

Other than mailing lists and CVS, TLDP’s use of technologies of cooperation is minimal but highly effective. Requiring metadata makes documents easier to find and to use in a trusted manner. Choosing an open markup

language, XML, and an open tag set, Docbook, as opposed to Word or even PDF, gives the documents flexibility and longevity. That flexibility includes the ability to use open-source publishing tools such as openjade, the dsssl stylesheets, libxml2, xsltproc, XSL, etc. (Hogbin, Komarinski, Godoy, & Merrill, 2004).

Because of the strong and mostly friendly involvement of the editors, there are few documents rejected. In fact, most rejections occur at the proposal stage and usually because of content overlap with an existing document. Even then the proposing author is encouraged to contribute to the overlapping document and so to be a part of the continuing process (G. Ferguson, personal communication, May 12, 2004).

The current TLDP archives hold works from over 500 different authors, although not all of the authors are active at one time. There are 345 subscribers to the discuss@en.tldp.org list, 52 active editors, and a core team of 19, as well as translation coordinators working in languages from Albanian to Walloon. The impact of TLDP cannot be overestimated. Not only are TLDP documents distributed with major Linux software distributions, but also the entire site is mirrored or copied completely on over 300 official sites around the world (see <http://tille.soti.org/images/tldp-world.jpg>).

THE DEGREE CONFLUENCE PROJECT

The goal of the Degree Confluence Project (DCP) is to document visits to “each of the latitude and longitude integer degree intersections in the world” by narrative descriptions and photographs. The photographic narrative usually includes at least one photograph of a GPS (Global Positional Sensor) device showing evidence of having been at the confluence. The first project visit documented a trip by project founder Alex Jarrett in February 1996 when he and friend Peter Cline visited 43 degrees North 72 degrees West near Hancock, New Hampshire (Jarrett, n. d.). Jarrett posted information about his confluence visit to a personal Web page and invited others to send him information about their own visits to confluences. Before long, new people and new technologies were put in place to support a grander plan: to document visits to all confluences on or within sight of land. As of this writing, 3,137 confluences in 148 countries have been visited and successfully documented (Degree Confluence Project, 2004a).

Degree Confluence is a masterpiece of PHP and MySQL coding that allows for interactions with other sites including Mapquest (for street maps) and Terraserver (for aerial maps of the United States) as well as links to the antipode, or exact opposite side of the globe, for each confluence and navigation to adjacent confluences. Additional customized mapping allows for a clickable view of the world composed of images taken by confluence visitors.

While the Degree Confluence Project might on one hand be thought of as an eccentric excuse for using techie toys (GPS, map-coding projects,

digital cameras, etc.), it clearly has other components, including social and educational. My own son's fifth grade class has used the Degree Confluence Project in learning about geography, mapping, and global environments. The project is not without the occasional dramatic moments as volunteers trek to exotic confluences. Most recently in the search for 19 degrees South 49 degrees East, one half of a honeymooning confluence-seeking pair vanished for 23 hours—arrested as it turned out (Christen & Christen, 2004).

Besides being about technology, mapping, global awareness, and drama, the Degree Confluence Project is about volunteerism, sharing, and trust. As seen in the Linux Documentation Project, there is some gate keeping done by volunteers, but this gate keeping is minimal, usually in the form of rejecting incomplete submissions, attempting to clear up confusions about the proper geographic datum to use, or confirming the photographic guidelines (D. Patton, personal communication, May 12, 2004). In the FAQs for the DCP, the theme of trust is reiterated: "Basically, we trust people, unless we can show that it's not at the right spot (usually by comparing with a map) or the narrative clashes with the pictures, then it will be more thoroughly verified" (Degree Confluence Project, 2004c).

The Degree Confluence Project handled an average of 120 submissions a month in the past year, June 2003 through May 2004 (Degree Confluence Project, 2004d) with a volunteer staff of 3 administrative coordinators, 2 technical coordinators, and 8 regional coordinators (Degree Confluence Project, 2004b).

The PHP/mySQL-based Web site and associated database, along with custom mapping software, support most of the contributor interactions for this project. The Degree Confluence Project also uses email and mailing lists to coordinate activities but, unlike TLDP, Degree Confluence exercises little in the way of version control or other oversight. Still, the fast-paced growth and internationalism of the site show that its contributors have earned the trust of the administrators and visitors to the Confluence Project, making it a valuable way to learn about the world.

ETREE.ORG

Moving from software documentation and global adventure to trading music that is recorded live is not such a far leap. In many ways the culture of sharing concert tapes has been a model for ad hoc communities of interest organizing themselves in a variety of communications and exchange media going back to using the postal service or even trading tapes hand-to-hand at concerts.

As bands with fanatical followers go, few in history can compare in intensity and in longevity with the Grateful Dead. Phish, Dave Matthews, and Dead spin-off bands do not pick up the identical memberships but they do pick up nearly identical enthusiasms. In the online world—as well

as in “meatspace,” as Grateful Dead songwriter and net-spokesman John Perry Barlow has called the non-cyberworld—Deadheads are a community by any definition.

Since the 1960s, fans of these bands have been recording concerts and trading tapes. After a while and after many poor-quality tapes were circulated, the Grateful Dead created a policy for tapers that included a special tapers’ section at every concert and some simple ground rules for noncommercial use of the tapes. This practice became more institutionalized and is a part of every Grateful Dead concert to date (The Dead, 2004). Along the way, tapers themselves sought out standards for describing the recording steps, including concert conditions, microphone specifications, audio transformation, and varieties of ways in which digital audio could be distributed in near lossless formats. Most recently they have settled on SHN (or shorten), but they have an eye open for emerging formats such as FLAC (Etree.org, 2004c, 2004d).

It is worth noting that fan taping has not stopped the Grateful Dead from creating and selling their own CDs of their live shows. In fact, the Grateful Dead has developed not only one of the largest archives of live shows, but also—possibly in response to the tapers’ insistence on high quality and open description of conditions, etc—the band’s organization publishes, in detail, the steps with which their commercial live concert CDs are made (The Dead Summer Getaway, 2003). Grateful Dead fans also shared information online. From the earliest days of virtual communities, Deadheads filled the most active discussion groups on the WELL (Rheingold, 2000). Fans of later bands such as Phish took a page from the Dead’s book and built communities of their own both in concerts and online, including Phish.net.

Over the years, a number of Web sites have been developed to assist in the trading of high-quality concert recordings. The direct predecessors of Etree.org are PCP, People for a Clearer Phish, and Sugarmegs (a name in which the Grateful Dead song, Sugar Magnolia, meets megabytes). PCP is a CD trading tree organization that uses CDRs and postal mail to spread live recordings of Phish concerts from limbs to leaves (People for a Clearer Phish, 1999). Sugarmegs was originally dedicated to sharing recordings of Grateful Dead concerts in various formats by downloading and by streaming—the site was even hosted by Microsoft at one point in its life (Black, 2000). Etree.org prides itself on offering the highest-quality recordings with the least compression. As the site’s home page states,

etree.org is the award-winning leader in lossless digital audio distribution on the Internet! We are a community committed to providing the highest quality live concert recordings in a losslessly-compressed, downloadable format. All of the music on etree.org is free, and 100% legal to download, trade, and burn. We also assist new traders in learning to trade online through our extensive guides. (Etree.org, 2004b)

Of the three projects considered, Etree.org makes the greatest use of the largest variety of technologies. The Etree site is really several sites with several different, but interrelated, functions. Etree.org, the Web site, has been supplanted by wiki. etree.org (more below). [Forums. etree.org](http://forums. etree.org) offers threaded discussion groups to members via PHPbb. [News. etree.org](http://news. etree.org) offers a syndicable blog and announcement area via Postnuke. [Etree.org/irc](http://etree.org/irc) gives access to real-time chat among etree-ers via Internet relay chat. [Db. etree.org](http://db. etree.org) is the gateway to the real business of etree; it is the database that describes in extreme detail the music that etree members have to share. And [Bt. etree.org](http://bt. etree.org) gives access to the actual music via the peer-to-peer BitTorrent protocol.

Etree also has the most individuals directly involved in managing the project's resources. Volunteer Tom Anderson reports that there are over 280 people who have some kind of administrator privilege for db. etree.org. However, only three of those are involved with technical administration of the site and related database. The others are volunteer content administrators who are assigned to specific artists or who help out with artists who do not yet have an assigned administrator (T. Anderson, personal communication, May 14, 2004). Over 350 artists have had shows recorded and placed in the database.

Etree sites other than the database site require only a few administrators. The etree site with the next largest number of people involved is forums. etree.org, where up to eleven volunteers serve as moderators. According to volunteer Caleb Epstein, www. etree.org has often languished, been out of date, and was even occasionally inaccurate in large part because the administrators rarely found time to work on it. To alleviate this problem, etree.org chose a more open solution, a wiki, which has been wildly successful and popular (C. Epstein, personal communication, May 12, 2004).

A wiki is software that allows simple writing, linking, publishing, and editing in a collaborative and collective fashion. Thus, when readers find a mistake or have new news or additional information, they can quickly add their knowledge to the pages. While many fear that pages as open as wiki pages might be defaced or become full of misinformation, experience shows that this is not the case. Wiki pages do show a history of changes and do allow changes to be rolled back out if needed (WikkiTikkiTavi, 2004).

The wiki philosophy was already in place at etree.org in their use of the trading database at db. etree.org. Of the over 104,000 members who have created sign-ins that allow modifying or adding to the information in the database, Anderson reports that he has banned only 10 members since 1999 (T. Anderson, personal communication, May 14, 2004). Many of the static pages within db. etree.org are also wiki pages, which may be edited or added to by any registered member. The database itself is really a collection of metadata—rather than an audio collection—about shows performed, and hopefully recorded, by tape friendly bands. The set lists,

dates, venues, and the like are included, as well as, for cases in which there are SHN recordings, metadata describing the conditions under which the recordings were made.

An example of a successful metadata entry for a concert might look like this:

Band: Charlie Hunter Trio
 Date recorded: 05/21/2004
 Venue: Mr. Small's—Millvale, PA
 Source: Soundfield ST-250 (stage lip, M-S) > Lunatec V3 (24/96) > M-Audio Firewire Audiophile > Sony PCG-V505AX > WaveLab 4(24/96)
 Conversion: WaveLab 4 (dither and resample) > SoundForge 6 (M-S decoding) > CD Wave Editor > FLAC
 Recorded & Converted by Jef Fugh

This is followed by the set list and comments. The database also allows for additional comments by other volunteers and links to other recordings of the same show should they exist. Once submitted, the record must be reviewed by a volunteer before it is published (db.etree.org, 2003).

Bt.etree.org is a slightly different case from the database site in function, in size, and in the metadata review process. BitTorrent, the “bt” in the name, is a peer-to-peer file-sharing system that allows parts of large files to be downloaded from several sites at once, thus reducing the bandwidth and processing demands on any single machine. The Free Software Directory describes BitTorrent as

a tool for copying files from one machine to another. FTP [File Transfer Protocol, the most common protocol for downloading files] punishes sites for being popular. Since all uploading is done from one place, a popular site needs big iron and big bandwidth. With BitTorrent, clients automatically mirror files they download, making the publisher's burden almost nothing. (Casey, 2001)

The person seeking to download a file uses a BitTorrent client. The client connects to a BitTorrent tracker, like bt.etree.org, to initiate a download.

The tracker's job is to keep tabs on computers that have successfully downloaded files. The tracker does not have the music file itself but instead has a list of those who have that file. The actual download comes from the computers that most recently received the file themselves. Each of those computers contributes a portion of the file being sought. The client assembles the portions sent to create the complete file. At completion of the download, the new file receiver is added to the tracker so that that computer may now help with the next torrents. The more popular a file is, the more sites participate in each download.

While it is possible to only download with a BitTorrent client, you pay a performance penalty for being a “leech.” That is to say that refusing to allow uploads will result in a slower download (Etree.org, 2004a). This

download penalty is a practical solution to the “free rider problem” that occurs in so many volunteer projects.

Bt.etree.org requires similar metadata to that required by db.etree.org. Volunteers review the metadata at bt.etree.org, but those metadata are immediately viewable by all. Despite this lesser degree of gate keeping, Epstein reports that there have been only 88 banned torrents on bt.etree.org out of 3,941 total. Most of those banned torrents are a result of misunderstanding about the taping policies of the artists involved (C. Epstein, personal communication, May 12, 2004).

Etree.org contributors can and do create some sophisticated metadata within their special interest area by following some clear guidelines. The pressure of being responsible to one’s peers and to be corrected by them, if in error, might be one key factor for the high degree of reliable metadata. However, a pride in one’s collection and a willingness to share also contribute to the quality and reliability of the data and the metadata.

Of the three sites considered, Etree.org contributors face the least initial gate keeping and are offered the broadest array of technologies and forums for interacting and collaborating. Etree.org also involves the greatest number of volunteers, but interestingly enough the bulk of the volunteer work is not in the area of technology support. Instead, the volunteers mainly serve to facilitate communication and support quality assurance.

CONCLUSION

From a tightly focused technical content site to a site for recording adventures to a site for music sharing, we have seen that these three long-lived and heavily used sites follow different and somewhat unexpected models in their choices of technologies for cooperation. The Linux Documentation Project uses fairly base technologies. Confluence.org uses elaborate custom-developed software to record adventures. Etree.org seems to have left few technologies of cooperation untried.

The degree of gate keeping is also highly variable. The Linux Documentation Project operates with a strong, but writer-friendly, editorial structure that is managed using the same technologies that one might use to manage a software project. Contributors to Confluence.org and Etree.org face almost no initial gate keeping. Etree.org does rely on moderators for their discussions and assigns volunteers to be the representatives to each band in the database, but the main work of the project, the database and BitTorrents, are very open and rely heavily on trust.

All three projects report a very low rate of rejections or banning of materials or contributors, showing that the extension of trust to the community has been repaid by strong support and adherence to the behaviors defined by the projects. The overall message is that a variety of projects can be well served by extending trust to the communities of their users or clients. While these projects might have been implemented using pro-

prietary software, the independent, open, and trusting spirit required for these projects is better represented by open-source code that allows the technologists to bend and extend the software to the particular needs of their communities.

Table 1. Description of Technologies Discussed

Technology	What It Does	Who Uses It	Where to Find More Information
BitTorrent	Peer-to-peer file sharing	Etree.org	http://bitconjurer.org/BitTorrent/
CVS— Concurrent Versions System	Tracking and managing changes to software and documents	Linux Documentation Project	http://www.gnu.org/software/cvs/
Docbook	Open XML tag set for document publishing	Linux Documentation Project	http://www.docbook.org/
FLAC—Free Lossless Audio Codec	Archiving and distributing CD-quality audio content	Etree.org	http://wiki.etree.org/index.php?page=FLAC
Mailman	Mailing list management	Linux Documentation Project	http://www.gnu.org/software/mailman/
mySQL	SQL database	Etree.org, Confluence.org	http://www.mysql.com/
PHP	Scripting language for creating dynamic Web pages	Etree.org, Confluence.org	http://www.php.net/
PHPbb	PHP- and mySQL-based bulletin board	Etree.org	http://www.phpbb.com/
PostNuke	Content management and weblog system	Etree.org	http://www.postnuke.com/
rsync	Fast incremental file transfer and archive synchronization	Linux Documentation Project	http://samba.anu.edu.au/rsync/
SHN—Shorten	Archiving and distributing near-lossless compressed audio	Etree.org	http://wiki.etree.org/index.php?page=Shorten
WikkiTikkiTavi	Creating, editing, and maintaining Web pages collectively and collaboratively	Etree.org	http://tavi.sourceforge.net/
XML— Extensible Markup Language	Flexible and extensible text markup for electronic publishing	Linux Documentation Project	http://www.w3.org/XML/

There is no reason why these tried and true examples should not serve as models for future library collections and for community collaborations. Indeed, the world represented by Weblogs, Creative Commons licenses, and the Library of Science—as well as the examples in this article—point to an opportunity for a new a “Information Commons” movement (Kranich, 2004).

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