The use of a digital rights management system for article delivery

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Abstract This paper describes: (i) the use of digital rights management (DRM) systems in providing a secure electronic document supply service; (ii) the reasons for the use of DRM systems by document suppliers; (iii) the system adopted by the British Library, with reasons for the rejection of some systems; and (iv) some insight into how the chosen system has been received by users.

INTRODUCTION

The British Library is one of the world's major research libraries with a collection of over 150 million items extending to over 600 km of shelving. The Library also offers services, including the supply of copies of articles from serial publications, to off-site users through its document supply services. The Library is in the process of realigning its strategy and its new vision is to "support anyone who wants to do research" by offering services that are "time and space independent;" supplying information to researchers whenever they want it and wherever they are located. This means that, for researchers who are not able to visit the Library's reading rooms, the speedy supply of information to the desktop is a key component to realizing the vision. The only practical way of

achieving desktop delivery is by electronic means and so electronic document delivery (EDD) is a major plank in achieving the British Library's vision.

EDD is a relatively new addition to the older methods that libraries have used to supply copies of items that are not held in the local library. These are (i) interlibrary loan (ILL), which involves the loan of the book or journal issue and has been in place for over 100 years, and (ii) document supply, or the supply of a surrogate copy (usually a photocopy, but an electronic copy in the case of EDD) which has largely replaced ILL over the last 30 years. EDD can be very fast, almost instantaneous if the delivery can be directly to the user's desktop and the article has been sourced from an electronic original. As a result

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EDD has proved to be very popular with researchers, who can easily and quickly obtain copies of articles that are not held locally. However, publishers see the possibility of researchers obtaining copies of articles at almost the same speed as if they were available by subscription to an electronic journal, but without the need for that subscription, which entails loss of revenue to the publisher. Publishers are concerned that EDD gives libraries even more reason to cancel subscriptions to journals and rely on document suppliers and other libraries instead — the so called “just-in-time” versus “just-in-case” argument. Publishers have voiced these concerns ever since traditional document supply began in the early 1970s, well before the introduction of EDD, but EDD has greatly increased their concerns.

Libraries, on the other hand, see instant supply as a natural progression in the evolving nature of the document supply process. They want to be able to offer a service level that is equivalent to that of local supply, involving the use of both electronic journals and EDD. In many countries, the use of electronic journals and EDD for document supply purposes would be interpreted as an infringement of copyright legislation. So, in order to use electronic journals and offer EDD, libraries need the agreement of the rights holder, normally the publisher. Because of the concerns outlined above, many publishers are unwilling to provide such agreement unless a way of controlling EDD is in place. Attempts to control use by means of contract have been implemented by many suppliers but abuse, both deliberate and unintentional, is common. One much more secure method of control is by the use of digital rights

management (DRM) on the transmitted file. This paper offers a background on the use of such systems and describes the implementation of such a system by the British Library.

DIGITAL RIGHTS MANAGEMENT

DRM can mean either the digital management of rights, as in the context here, or the management of digital rights. The latter term, which is a market enabling technology, encompasses the identification and description of content and includes information about the rights and permissions associated with that content; usually this is done in such a way as to be interoperable with other content and access systems.

The digital management of rights means the technical protection measures that are added to (or wrapped around) a piece of content. This usually involves the use of some form of encryption and access control mechanism. As well as preventing unauthorized access, the controls limit various aspects of use of the content. For EDD, such limitations include the number of copies that may be printed; whether the file may be copied; the length of time that the file may be accessed; and whether the content may be “cut and pasted.” Unlike the management of digital rights, there is little standardization in the digital management of rights.

Many systems have been developed to control the use of digital objects, for example, e-books. Here the user, after downloading the necessary access software, can obtain an e-book and obtain rights to access it using a variety of business models. These business models are usually based on analogies

with the borrowing of physical books; for example, the length of time the e-book is available can be controlled, as can the ability to lend the e-book to another user.

REASONS FOR IMPLEMENTING DRM FOR DOCUMENT SUPPLY

At least three major document suppliers, the British Library, the Canada Institute for Scientific and Technical Information (CISTI) and Infotrieve (a commercial document supplier in the USA), have implemented a method of secure electronic delivery. Although the three systems differ technically, they have all been implemented for the same reason. That is, as stated above, unless such systems are in place, some publishers will not grant the necessary rights for EDD to be provided.

This may seem an irrational response from publishers, nearly all of whom allow unsecured access to their online journals for subscribers and pay-per-view customers. The main reason why publishers are unwilling to grant similar access through document suppliers is that they are not in direct control when supply is through a third party and they fear that inappropriate use might result. DRM systems offer to control inappropriate use.

THE BRITISH LIBRARY AND ELECTRONIC DOCUMENT DELIVERY

The British Library has experimented with several forms of EDD over the last 20 years, using one proprietary system for the last ten years. This system, called Ariel, is essentially a method of transferring image files of higher quality than commercial fax machines over the

internet. It is a standalone system and, to date, it has not been possible to integrate it into the automated request processing systems used by the British Library in its document supply services. Furthermore, Ariel is not much liked by publishers, as they claim that there is little, if any, control possible. Because the system is designed to be used by libraries, it is not possible to transmit documents directly to the end-user without the addition of further action on the part of an intermediary, which incurs delay and adds unnecessary work for librarians. For this reason the British Library has begun to discourage the use of Ariel among its user community and to educate librarians of the potential for infringement of copyright.

The British Library's aim was to offer electronic access to information through a service that any user could use, and which did not require the Library to offer bespoke software. The first challenge, however, was to ensure that all of our copying created a digital file which we could then transmit securely. In 2003, the Library upgraded its copying processes and replaced all the photocopy machines with digital scanners. Although initially used for output in print format, this gave the possibility to supply any item from the collection by electronic delivery, including the integration of the Ariel system, as well as the use of additional methods of electronic document delivery. In addition to resolving the technical issues, it was also necessary to obtain agreement from either individual publishers or their agent in the UK, the Copyright Licensing Agency. A secure electronic delivery system was a prerequisite for rights being granted by publishers.

THE CHOSEN SYSTEM

Several forms of secure electronic delivery were investigated. All of these were based on DRM systems. Many of the early systems were rejected for one or more of three reasons. Either they:

- were too expensive;
- were too complicated; and/or
- did not work as expected.

During 2002, the British Library worked closely with Elsevier, a major Dutch journal publisher, to develop a system which, it was hoped, might develop into an industry standard. The Adobe[®] Content Server and Adobe eBook Reader[®] systems were chosen. These permit the encryption of existing Portable Document Format (PDF) files in real time and allow a variety of security levels to be set. Initially, the following parameters were used:

- use of the file was restricted to the machine on which it was downloaded;
- printing was set to one copy only;
- saving and viewing of the article was permitted, but for a limited period of time.
- forwarding and copying was disabled;
- annotations and conversion to speech were permitted.

An added advantage for users was that the system used software that was readily available at no cost from a well-known and reputable company. Many of the other systems rely on plug-in software, often supplied by very small companies. Since the initial work Adobe has integrated its eBook Reader software into Adobe Reader from version 6 onwards. This has the added advantage that, as most users already use

Adobe Reader, it is not necessary to install any additional software to use the secure document delivery system. The requirement for version 6 has, however, caused some challenges, as will be discussed later.

It was decided that, rather than “push” the PDF file to the requester, it would be better for the requester to “pull” the file from a British Library server. There were several reasons for this. For example, many of the problems associated with the transmission of large files as email attachments and those caused by firewalls are overcome if the requester controls the process. The drawback is that, for the standard requesting methods, the user is not online to the British Library and so cannot initiate the downloading process. However, the British Library does offer two services that can be used for online delivery.

These online services (called Inside and British Library Direct) allow users to search for, and select, individual articles from a listing of journal content pages. Individual articles can be requested for delivery through a web interface. The British Library has agreements with some publishers for the storage and use of online journals. These publishers permit the delivery of requested articles to be online (a PDF icon alongside the bibliographic citation signifies that the article is available for immediate download). When such a request is placed, the PDF file is retrieved from the electronic store and encrypted using Adobe Content Server before being downloaded by the user for viewing and printing using Adobe Reader. The file is encrypted according to the parameters listed above.

A different approach has been adopted

for material held in paper format, as the user cannot keep the online session open while the paper original is retrieved and scanned. After the article has been scanned, it is converted to PDF format and encrypted in the same way as above. The article is then loaded onto a server. An email message containing a link to the article on the server is sent to the user. Because the security permits only the person who opens the link to download the file, it is important that the requester should be the person to do this. Thus, if the request is sent via an intermediary, the intermediary should forward the email message to the original requester before downloading takes place. An added advantage is that, as the encryption and access software is exactly the same for born-digital and scanned files, both types can be transmitted and accessed in exactly the same way. This method has also been adopted for offline services. For all of these an email message is sent to the user or intermediary after the encrypted file has been loaded onto the server. In all instances, the link to the file is only available for a limited period of time and the link is disabled after the first download has taken place.

THE SYSTEM IN PRACTICE

The system has been rolled out in a phased manner. It began in December 2002 for Inside users, as “Secure Electronic Delivery.” Additional phases were delayed until after Adobe changed the reader software from eBook Reader to Adobe Reader v6 (in June 2003). The version linked to scan on demand from paper originals became operational in December 2003. It is now available for almost all the services offered and, at the time of writing (September 2005),

Secure Electronic Delivery is now responsible for over 15 per cent of all items supplied.

The main issues that have arisen are:

- Some organizations have been slow to upgrade to the latest version of Adobe Reader. These are particularly large organizations with complex infrastructures and where the library does not have any influence to demand software upgrades.
- Users want to be able to share the received file between different machines, for instance a desktop machine and a PDA. This is now possible with the latest version of Adobe Reader.
- Some customers who mediate requests have asked for the ability to check the item before it is forwarded to the end user. At present the system does not permit this, but a solution is in development.
- Some customers have licenses in place with publishers and their agents which permit further uses of any documents received in electronic format. Again, a solution to this problem is in development.
- Adobe has recently announced that it will not support Content Server after the end of 2006. A replacement for this is currently under review.

Reaction to the system has been very positive. Many users have commented favorably on the speed of delivery and the ease of using the system.

CONCLUSION

Supplying information to a user's desktop is a key strategic mission of the British Library. Researchers want to be able to access information wherever they are — and helping them do so is

important if libraries are to remain relevant. Given the complexities of copyright legislation, DRM has been the chosen mechanism to allow the British Library to supply documents to the desktop with the support of the copyright owners.

The DRM system chosen by the British Library has proved to be successful and well received by many users. At first sight, the use of such a complex system for what is a relatively low-cost product may seem overkill, but it was the best way for the British Library to obtain the rights that it required to be able to continue to offer electronic document delivery. It is hoped that, as both publishers and users become more familiar with the use of such technology, the technology will become more sophisticated and even easier to use.

For over 40 years the British Library has adopted an innovative approach to

supplying remote users. Secure Electronic Delivery is just the latest innovation in the Library's continuing efforts to remain a world-class facility.

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APPENDIX

Organizations and systems mentioned above (websites accessed September 2005)

Adobe Content Server: <http://www.adobe.com/products/contentserver/overview1.html>

Ariel: http://www4.infotrieve.com/products_services/ariel.asp

The British Library: <http://www.bl.uk>

CISTI: http://cisti-icist.nrc-cnrc.gc.ca/cisti_e.html

The Copyright Licensing Agency: <http://www.cla.co.uk>

Elsevier: www.elsevier.com

Infotrieve: <http://www.infotrieve.com>