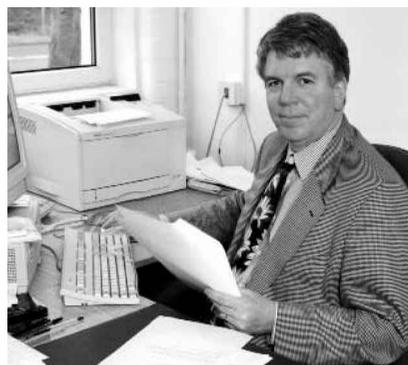# The use of electronic journals in a document delivery service

Based on a paper given at the UKSG 'Taking the plunge' seminar, 22 May 2002

The reasons for using electronic journals in a document delivery service are discussed. The history of use of electronic journals in the British Library's (BL) document delivery services are described from Adonis starting in 1988 to the Electronic Storage and Retrieval System (ESTAR), which was implemented in May 1999. The link between the BL's Inside service and ESTAR which permits Inside users instant electronic document delivery (EDD) of requested articles is also described. Finally, the publisher stance relating to EDD and why the BL adopted a solution involving secure EDD using Adobe eBook Reader software are examined.

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Introduction

At first glance, it may seem rather strange to use electronic journals within a document supply service, as the latter traditionally assumes the supply to requesters of paper copies. However, many documents are now delivered by electronic means; indeed, an increasing number of users are coming to expect this as the norm. Some document suppliers are responding by scanning paper originals. The British Library has adopted this approach, but it has several disadvantages:

It cannot provide the instant 'point-and-click' delivery that users have come to expect. Because the process is manual, retrieving the printed issue from the stacks prior to scanning involves delays of at least several hours, or even days.

The quality is dependent upon the scanning resolution. High resolution, of at least 300 dots per inch, is required for reasonable print quality, but this gives rise to large file sizes, typically about one Megabyte for an average 10-page article with some illustrations.

Unless the scanner can operate at the same speed as a photocopy machine, then the cost of production of scanned copies is likely to be greater.

A far better solution is to use the electronic file as produced by the publisher. Several document delivery suppliers have explored this possibility. This paper outlines the developments that have taken place at the British Library to meet the demand for electronic supply of full text.

The British Library

The British Library offers a wide range of services, most of which would be expected from a prestigious national library. One of the services, not typical of a national library, is its document supply service. This began in 1961 and over the past 40 years has processed over 100 million requests. In the early days, much of the traffic was based on postal requests and the loan of items. Over the years, there has been a swing to electronic requesting, less than 2% of requests are now received by post, and a shift to the supply of surrogate copies, principally photocopies, which are now responsible for about 80% of all items supplied. Over its 40-year existence the range of material available for document supply has also grown, so that today over 40,000 current journal titles, over 4.5 million reports, over 3 million

monographs and 650,000 conference proceedings are available.

History of use of electronic journals

Many years ago, the British Library realised that electronic journals offered two potential advantages over the traditional (paper-based) methods used in document supply: (i) a much faster service (instant, if combined with electronic delivery), and (ii) the possibility of reducing processing costs. Although these advantages were first postulated in the early 1980s, it is only very recently that they have been fully achieved.

In the late 1970s, discussions began with the Adonis consortium [1]. However, it was not until 10 years later, in 1988, that a series of experiments for the document supply service began with use of the Adonis system. Adonis published bibliographic index material and the full text of some 200, later rising to over 600, journals on cd-rom. The system was used operationally within the British Library from 1991 to 1996, but, although it was proven to be technically robust, electronic delivery was never implemented. The system was stand-alone and substantive cost savings could not, in effect, be realised.

In 1992, the Library investigated the conversion of journals received on paper into electronic format by the scanning and indexing of articles as they were received. The pilot project, called the Image Demonstrator project, was small scale; some 48 titles were included for the two-year period 1993/94 [2]. The system was rejected because the cost of creating the electronic data (over £3.50 per article) was considered too high.

One of the publishers that had agreed for some titles to be included in the Image Demonstrator Project was Elsevier Science. In 1996, the Library began discussions with them about the use of several of their journals which had already been converted to an electronic version. These discussions led to a two-year experiment, the Trial Electronic Document Storage (TEDS) system [3] in 1997/98. For TEDS, unlike Adonis and the Image Demonstrator system, the index data were loaded into the Automated Request Processing (ARP) system. This gave the possibility of matching incoming requests immediately and forwarding them directly to the TEDS system. This reduced processing time to a few minutes. Also, the

publisher processed the text files into PDF format from the computer type-setting tapes. This resulted in much better quality reproductions of the pages compared to the scanned images used in all the previous systems.

This method of operation was judged to offer distinct advantages and the decision was made to take the whole of Elsevier Science's output, some 1,100 titles, in electronic format from 1999 onwards. The principal use was document supply, but the journals were also made available in electronic format in British Library reading rooms. Because of the scale proposed, a more robust system was required and the Library decided to implement a system developed by ScienceServer [4] for direct end-user access to electronic journals. The system has since been renamed ScienceDirect® OnSite by Elsevier Science [5]. The British Library implemented the system (with the internal name of Electronic STorage And Retrieval [ESTAR]) in May 1999.

ESTAR

Since that time, the service has been developed further. Titles from the Kluwer Academic Publishers, S. Karger AG, Emerald, Blackwell Science, Mary Ann Liebert, Lawrence Erlbaum, IEEE, IEE and Oxford University Press have been added. ESTAR now contains over 2,950 journal titles, 75,000 journal issues and over 1.1 million articles. Bibliographic data is provided in SGML or XML format. Most publishers also provide the PDF full text files for local storage on the system, but, for some publishers, the full text is stored remotely, either on the publisher's or a third party's server.

The document supply function works in the same manner for all publishers. There are two interfaces, automated and manual. In the automated system, incoming requests in electronic format are matched against the ESTAR index, which is loaded in the Automated Requests Processing system. Experience from the previous trials has shown that matching on journal title, year of publication, volume number and the start page number of the article produces the most accurate results. This gives the advantage that, provided the system can identify these fields, the request can be unstructured. Requests that can be processed automatically are handled in batches.

Because the batches are small, articles are normally printed less than 30 minutes from receipt of the request. Requests that cannot be matched automatically are processed by staff using workstations which are identical to those in the reading rooms. These allow both browsing and simple and advanced searching.

Electronic document delivery

For some publishers, the link to electronic document delivery is now finally in place, and the 20-year-old predictions can be tested. The British Library has experimented with several forms of electronic document delivery over the years[6]. Many of the systems described have not come to fruition, although latterly the Ariel® system [7] has been used. All these systems are based on the use of scanned images of paper originals and, as discussed above, have disadvantages over PDF format. ESTAR, with articles stored on PDF format, removes these disadvantages.

As well as technical problems, there has been reluctance by publishers to grant the necessary rights for electronic document delivery. This reluctance is based, in the main, on fears that such delivery will lead to a loss of subscriptions. Arguments to counter this perception[8] have been met with a degree of scepticism by publishers.

It became clear that publishers required some form of security on the transmitted files before they would agree to the principle of electronic document delivery. This security not only protects the file during transmission, but also controls what the user can do with it after it has been downloaded. The exceptions in UK copyright law under which copies can be produced from paper originals do not extend to electronic originals, so it is necessary to get publisher agreement before electronic originals can be used.

Several forms of secure electronic delivery were investigated. Most of these were based on Digital Rights Management (DRM) systems. During 2002, the British Library worked closely with Elsevier Science to develop a system which, it is hoped, might develop into an industry standard. The Adobe® Content Server and Acrobat eBook Reader® systems were chosen[9]. These permit the encryption of existing PDF files in real time and allow a variety of security levels to be set. Initially, the following parameters have been chosen:

any use of the file is limited to the machine on which it is downloaded;

printing set to one copy only;

saving and viewing of the article is permitted, but for a limited period of time. (The time period has not yet been fixed);

forwarding and copying are disabled;

annotations and conversion to speech are permitted.

It was also 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, but many of the problems associated with the transmission of large files as e-mail attachments and 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. One service that does offer direct online access is the British Library Inside service.

The Inside service allows users to search for, and select, individual articles from the listing of journal content pages. Individual articles can be requested for delivery by conventional methods through a web interface. Some of the publishers with material on ESTAR permit the delivery to be online (a PDF icon alongside the bibliographic citation signifies that the article is available for immediate downloading). When such a request is placed, the PDF file is encrypted using Adobe Content Server and downloaded for viewing using Adobe Acrobat eBook Reader. The file is secured according to the parameters listed above.

For the standard service a different approach will be adopted. An e-mail message containing a URL link to the article will be sent to the user, once the item has been retrieved from ESTAR and loaded onto a server. Because the security permits only the person who opens the URL 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, it is important that the intermediary should forward the e-mail message to the original requester before downloading takes place.

This solution can be adapted to permit scanned images to be delivered as well. It is envisaged that some material will only ever be available in paper format, but will need to be delivered by electronic means. The scanned image can be converted to

PDF format, encrypted and transmitted in exactly the same way as native PDF files. This will mean that the user will not be aware of the format of the original item.

Conclusion

As researchers access more and more source material in electronic format at their desktop there is a danger that material that cannot be instantly accessed will cease to be used. The claim that "It doesn't exist if it's not on the Internet" can be restated to "It doesn't exist if it's not included in the most popular Search Tool". It is in the scholarly and research communities' best interests that as broad a range of quality publications as possible continues to be made available and easily accessible. One possibility is the British Library Inside service mentioned above. This provides access to 20,000 journals, in both electronic and paper format. Once the necessary linking mechanisms are implemented the user will be directed to titles for which a subscription is held locally in electronic format and only directed to the British Library for non-subscribed material. Articles will appear on the user's desktop, many instantly, and all in the same format, whichever source is used. This becomes a one-stop seamless service, combining the best of holdings and access, within an integrated system. All stakeholders become beneficiaries, particularly the end-user who is saved from the traumas of searching multiple sites when looking for required material; libraries remain key gatekeepers in the process; and publishers gain from the increase in royalties generated from the peripheral market sector. A winning situation for all.

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