THE BIG FLAME
A MODEL FOR A UNIVERSAL FULL-TEXT ELECTRONIC LIBRARY OF RESEARCH

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1. INTRODUCTION

Academic publishing, after total reliance on the printed page since inception, has entered a critical period of change. The opportunities offered by information technology have finally been recognised, perhaps more slowly than some commentators expected, during the last few years.

There now exists a diverse range of electronic versions of commercial scholarly journals, available either on CD-ROM or the Internet, providing the reader with state-of-the-art content searching, text retrieval and graphical presentation facilities. In addition, groups of scholars are collaborating to create and operate non-commercial electronic journals, using easily available networking tools provided by their institutions. During the next few years, more and more electronic solutions will appear, driven by user demand and a competitive market place.

These developments have been welcomed by the community, since they offer a major improvement in access to information. However, they still suffer from some restrictions, most notably the difficulty of both searching and retrieving from a large number of separate electronic journals concurrently. In order to fully capitalise on the expanding information market-place, users will demand increasingly more powerful tools and connectivity to provide faster and more reliable information delivery. They will also demand greater certainty with regard to quality assurance, intellectual property rights and charging.

The major challenge currently facing those concerned to foster and disseminate research is therefore:

> **to use common technology and emerging international standards to build an electronic information infrastructure for the next century that introduces the level of control that now exists for printed documents, and significantly enhances the efficiency of storage, retrieval and delivery.**

2. THE MODEL

There is a relatively simple model that will achieve this, by combining the best features of emerging technologies (the openness, accessibility and enablement offered by the Internet) with the structural stability of traditional publishing (academic quality control, bibliographic control, an established economic model).

Individual countries would operate the following model:

- Each university maintains a secure server to host the multimedia, full-text and graphic image, database of its research and other scholarly output (articles, dissertations, theses, etc.). These servers form a distributed database.

- The documents in the distributed database are indexed in a central, national "bibliographic" database, containing data on author, title, date, abstract etc., and provided with a comprehensive search-and-retrieve interface.

- This central database performs the additional functions of indicating the academic status of the individual documents (refereed or unrefereed, a thesis, etc.) and mirroring existing print-based information structures, such as the journal.

- Researchers have access through the Internet to this central database. Electronic copies of documents discovered are ordered by, and transmitted from the distributed database directly to, the end-user.

- Document integrity and security are preserved, since end-users have no direct access to the servers comprising the distributed database.

- Management and accounting data are maintained by the central national database.

- Each institution is therefore empowered to become the electronic publisher of its own work.

- The system would be extended to commercial publishers: each would run its own server in the distributed database; bibliographic data would appear in the central database; publishers would charge for documents delivered.
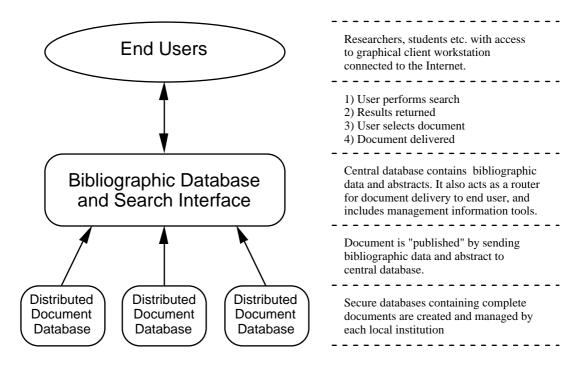
It will be noted that this model is an inversion of existing practice. Until now, higher education institutions have generally sought to collect the relevant works of scholars of **other** institutions in order to make them available to their own scholars.   Given the explosion in the number of researchers and the volume of information, the achievement of this aim has become impossible.

Under the new model, higher education institutions collect only the works of **their own** scholars, and make them available to other institutions. Information technology and network infrastructures deliver such documents immediately. A modern information infrastructure for libraries and information services is developed.

Each central national database functions both as a national bibliography and as a national document delivery system for research. Availability of the national databases over the Internet creates a worldwide information infrastructure.

3. FUNCTIONALITY

The functionality is outlined in the following diagram:

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        End Users                    Researchers, students etc. with access
                                      to graphical client workstation
                                      connected to the Internet.

                                      1) User performs search
                                      2) Results returned
                                      3) User selects document
                                      4) Document delivered

  Bibliographic Database              Central database contains bibliographic
  and Search Interface                data and abstracts. It also acts as a router
                                      for document delivery to end user, and
                                      includes management information tools.

                                      Document is "published" by sending
                                      bibliographic data and abstract to
                                      central database.

 Distributed  Distributed Distributed  Secure databases containing complete
 Document     Document    Document      documents are created and managed by
 Database     Database    Database      each local institution
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The utilisation by end-users of easy-entry technology and existing communications infrastructure, combined with the distributed nature of the database, helps to maximise the potential for replication.

4. TECHNOLOGY

While radical in effect, the model requires no great technological innovation: it is feasible with current infrastructure and entry-level technology, and would build on current research and development in the field of electronic

journals, information retrieval and the wide-area publication of information in digital form.

Innovation lies in the integration of emerging standards and technologies in the field of information networking and electronic publishing (eg Internet Protocols, Z39.50/SR, SGML, HTML, HyTime, PDF, MIME) and in the consolidation of results of current pioneering projects (eg GEDI, TEI, HYPERLIB, ELSA, SESAM, COPINET, DECOMATE).

5. **ECONOMIC AND SOCIAL IMPACT**

Implementing the simple technological model would however have the following far-reaching effects:

- individual institutions of higher education and research would be enabled to become electronic publishers;
- the process of academic publishing would become much faster and more efficient: a document is published when its details appear in the central database;
- the best features of print-based structures would be preserved (eg in the creation of 'virtual journals') and combined with the power of electronic information retrieval from unified national databases;
- advanced standards of bibliographic control would be introduced into the area of electronic publishing;
- mechanisms for charging could potentially bring about the integration of commercial and non-profit academic publishing;
- libraries would switch their emphasis from collecting the works of scholars of other institutions to facilitating network access to these works.

Implementation would contribute to the creation of the new worldwide information infrastructure.

The greater accessibility of information through networks should support the development of teleworking. An important element of skills transfer is inherent in the model, since institutions of varying sizes would become adept in the storage and delivery of electronic documents.

BIOGRAPHIES

David Ball has been Head of Library and Information Services at Bournemouth University for two years. For the previous five years he worked in the commercial sector as Information Manger with a newspaper

publisher, gaining extensive experience of setting up and running networked full-text databases.

Chris Spice is Head of Information Systems Development at Bournemouth University. He is currently developing an integrated corporate/campus information system incorporating a range of hyper-text, free-text and structured bibliographic databases. In a previous role he was Head of the Computer Systems and Networking Centre at Bournemouth University, and thus has extensive technical and project-management experience.