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Chaos - The Twenty-First Century ISBN

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Chaos — The Twenty- First Century ISBN

Column Editors: **Sandra K. Paul** (President, SKP Associates)
and **Albert Simmonds** (Director, ISBN —US Agency,
R.R. Bowker)

One of the issues we have been reporting on in this column is the development of the DOI System. During October and November,

article is displayed and the researcher wants to know how to get permission from the rights holder to use that image. If the table of contents or the image is marked with a DOI, the researcher will be able to click on it and be routed automatically to an electronic screen which would provide information about the article or the image. Development and maintenance of this electronic screen is the responsibility of the owner of the DOI; the System only routes the inquiries and the responses.

three very significant steps were taken in this process. First, the DOI System, under the governance of the International DOI Foundation, went live at the **Frankfurt Book Fair**. Second, the International Advisory Panel of ISBN Agencies initiated negotiations intended to lead to the incorporation of DOI Agency functions into the ISBN System. And, finally, the **National Information Standards Organizations (NISO)** in conjunction with **Book Industry Communication (BIC)** in the U.K. began the process of turning the DOI into an information standard.

The following article appeared in the December 5th issue of *Bookseller* (published in London by J. Whitaker & Sons). It provides further information on DOI development. Our column in the June issue will provide an update on the BIC/NISO DOI meeting (held in Washington on February 6) and on the ISBN/DOI Foundation negotiations.

The Twenty-First Century ISBN — by **Albert Simmonds**
(Director, Standards/Development, US ISBN Agency)

The **Digital Object Identifier (DOI)** System premiered at the **Frankfurt Book Fair** to a full house of publishing professionals whose interest had been piqued by pre-opening publicity. Many in the audience had been carefully following the development of DOI through such sources as *The New York Times* article of 22 September which stated that preparations are under way "to use the DOI System as part of more elaborate strategies for online purchases and the creation of encrypted keys or hidden marks to protect digital material from unauthorized copying."

The System was first seen last February in Washington, DC, at a meeting of the Professional/Scholarly Publishing Division of the **Association of American Publishers (AAP)**. Between the Washington and Frankfurt meetings there were several significant developments. In particular, the DOI System had developed into an international effort. The Frankfurt event was sponsored not only by the AAP, but also by the **International Association of Scientific, Technical and Medical Publishers (STM)** and by the **International Publishers Association (IPA)**. In addition, just prior to the book fair, the AAP transferred ownership of the DOI system to a new, non-profit-making organization called the **International DOI Foundation**, the purpose of which (according to a Foundation document) "is to support the needs of the intellectual property community in the digital environment, by establishing and governing the DOI System, setting policies for the System, choosing service providers for the System, and overseeing the successful operation of the System." The Foundation currently has offices in both Geneva and Washington.

How the System Works

Key to grasping the significance of DOI as an initiative is an understanding of DOI as a system for executing various processes on the Internet. The technology underlying the DOI System is called the **Handle System** and was developed by the **Corporation for National Research Initiatives (CNRI)**. This non-profit-making organization was formed in 1986 to foster research and development for a national information infrastructure. It is headed by **Dr. Robert Kahn**, an expert in this field with an international reputation.

The Handle System acts as an automated directory in which DOIs are registered by their "owners." This registration process allows the directory to route questions about a DOI product with a DOI mark to the owner of the DOI. For example, a researcher might see the table of contents for a journal on the Internet and want to get more information about some article contained in the journal. Or perhaps an interesting image in the

The DOI is a string of alphanumeric characters, the point of which is to identify objects in an electronic environment. Although work on the structure of this string is ongoing, a basic two-part configuration (a prefix and a suffix) has evolved. The prefix identifies the original registration agency and the original registrant. The suffix contains the individual product identifier, preceded by a code to note what kind of identifier is being used. As it is now understood, a DOI would look like this: 10.1234/[ISBN]08352 39365.

This code can be deconstructed in the following way. Part 1a (10) identifies the original registration agency. Part 1b (1234) identifies the original registrant. Part 2a ([ISBN]) indicates the product identifier being used and Part 2b (0-8352-3936-5) identifies the product. A solidus (/) separates the prefix from the suffix and a full point separates Part 1a from Part 1b. Part 2a is contained within square brackets.

It should be noted that Part 1 references the *original* agency and the *original* registrant. If that registrant sells the product being represented, the DOI does not change even though the new registrant is not identified. Thus, meaning originally built into the DOI is lost when product ownership changes. But, technically, the automated directory in which DOIs are registered will route queries correctly to the new owner.

Another complexity that makes the DOI a difficult concept to grasp is that each DOI is itself an identifier which is composed, in turn, of a string of secondary identifiers. The entire string is needed within the DOI System for queries and information to be routed correctly. (This process is referred to as resolving queries; the System is a resolver.)

The Digital Environment

It is important to note that the product identified by the DOI suffix can be a printed book or serial. "Digital" in the context of DOI refers to the environment in which the object is identified, not the medium in which the object is published. In addition, the object is not necessarily a publication, nor is the entity submitting DOIs to the Directory necessarily a publisher. The **Copyright Clearance Center (CCC)** in the United States has assigned DOIs to digital images of sample photographs from their database of 50,000 images. Clicking on these DOIs would route an inquiry to the CCC which, in this case, represents photographers who are the copy-right owners of digital rights.

Clearly, the presence of a DOI on a product will raise certain expectations in the mind of a potential customer, and the decision to use DOI must be well thought out. For example, the information that is provided to potential customers must be wide-ranging if the questions being posed by the hypothetical researcher are to be adequately covered by a screen that responds electronically. How will a publisher anticipate in advance what kinds of questions will be asked? Which products (or subsets of products) should be marked with DOI? Will journal subscriptions be sold via DOI-based inquiries or only articles? Will all articles be marked with DOI or only those that can be delivered electronically?

Just the First Step

These questions and issues have not escaped the notice of publishers who understand that the decision to incorporate DOI processes into their electronic commerce/rights management models will pose some fundamental questions about how these models evolve. In addition, it is clear that answering these questions is just the beginning step in developing the various transactions that can logically be carried out within the structure of "resolver" technology.

Another issue being widely discussed is the role of so called "secondary publishers" in the DOI System. The functions provided by document

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delivery services, abstracting and indexing services, subscription agents, etc., are key to electronic commerce and the management of rights. How will these organizations interact with the DOI Directory? Other questions focus on the incorporation of end users into the System. Libraries in particular are eager to understand how such processes as archiving will evolve in networked environments and how the DOI can be used to facilitate these processes.

The Question of Control

Then there are questions about governance of the System. As noted earlier, the International DOI Foundation has been established. The role that the agencies for International Standard Book Number (ISBN) and International Standard Serial Number (ISSN) might play in the development and administration of DOIs is being considered.

In the sample DOI cited above, an ISBN is used as the product identifier. An ISSN could be used, as well as any other identifier that the registrant might need for product identification. For many years the information industry has utilized the two complementary schemes of ISBN and ISSN for identifying monographic and serial publications. Because these schemes have been managed by international bodies and because they represent unique, persistent product identifiers, they are ubiquitous. The United States ISBN Agency was associated early on with development of the DOI, and this association between ISBN/ISSN and DOI is now international in scope.

Immediately following the Frankfurt Book Fair the **International Advisory Panel of ISBN Agencies** (a body which includes representation from the ISSN International Centre in Paris) convened in Stockholm, to debate the many issues which surround the DOI initiative. One major theme in these discussions was the need within the electronic environment for an open infrastructure, supported by standards such as those developed and maintained by the **International Organization for Standardization (ISO)**. As a result of these discussions, the panel passed a resolution that affirms the importance of the emerging System(s) for commerce and rights management. The resolution also authorizes the Director and the Executive Committee of ISBN International to negotiate with DOI management, the ultimate goal being the incorporation of DOI into

the global ISBN/ISSN network of product numbering agencies.

The functions connected with this enhanced view of the agency System are currently being discussed but would probably include, among others, the following: DOI prefix allocation; development and maintenance of DOI registrant databases; further development of ISBN/ISSN-based product identifiers; liaison with product identifier bodies in other industries (especially those covering products used in multimedia publishing, including music and film).

The body with whom ISBN International is carrying out negotiations is called the **Information Identifiers Committee (IIC)**, a joint committee of STM and IPA. The IIC is, in turn, also working with the International DOI Foundation.

These issues will be debated in a systematic way over the next few months. One organization that is driving this debate is the **National Information Standards Organization (NISO)** in Washington, D.C., an organization which "identifies, develops, maintains, publishes, and promotes technical standards and guidelines for managing the changing information environment."

The Need for Wider Investigation

NISO is using the concept of **International Standard Digital Identifiers (ISDI)** as a way of approaching the debate surrounding DOI. This approach not only emphasizes the complexity of the identifier element within DOI, but also posits the need for a wider investigation of identifiers in the digital environment. NISO has sponsored two ISDI forums to date. The most recent one resulted in the establishment of working groups to investigate a number of areas. These include the syntax of the elements that compose the DOI string, questions about what DOIs will identify, descriptive metadata, rights metadata, and applications of the DOI especially in the context of libraries and integrated library systems (ILS) vendors.

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The purpose of consortia is to form a platform on which libraries can cooperate in a formal environment. The real value that booksellers bring to consortia is the support services that facilitate cooperative collection management. Some of us are doing this now, and others will follow soon. Vendor Websites that enable book selectors at different libraries to work effectively together have real value. Websites that share information, that show each cooperating library what the other has selected, are here now. Approval plans can deliver books to one cooperating library in certain subjects, and books to other libraries in other subjects. Profiles can be written to share this information, or even override under specified circumstances, so all libraries get certain kinds of books within subjects instead of a strict subject/library delivery protocol.

Booksellers can develop services that will make consortial cooperation work better, but only if participating librarians help us. We can become an integral part of the collaborative process, and bring real value to cooperating libraries. But this can only happen if the focus is on a commitment to work together. If the focus is on getting higher discounts, we will all miss the opportunity to create new and useful technologies that can make cooperative collection management a practical reality.

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In addition, the **Coalition for Networked Information (CNI)** agreed to form an Internet issues advisory group which will provide liaison between DOI-related development and the Internet community. Reports from each group were discussed at the ISDI meeting in February in Washington, D.C.

Joining NISO in sponsoring the most recent ISDI forum was **Book Industry Communication (BIC)**. BIC is working specifically in the area of rights metadata. Prior to the November meeting BIC had announced the formation of the rights metadata working group with the brief "to liaise with other bodies to help define standard rights metadata elements for DOI-enabled and electronic data interchange transactions and to explore and help specify the mechanisms that will enable such transactions." In addition to NISO, BIC is collaborating with STM, IPA, the CCC and the **Serials Industry Systems Advisory Committee (SISAC)** in the U.S.

To Learn More

Two important discussions of DOI-related topics can be found on the BIC Internet site (www.bic.org.uk/bic/bicinfo.html). The first is a joint BIC/EDItEUR paper called "Unique Identifiers." This paper provides a general overview of the topic. The second is a British National Bibliography Research Fund report called "In Search of the Unicorn: The DOI from a User Perspective." This paper provides a searching discussion of the relationship between users and DOI. One section is comprised of a series of four "scenarios" which "attempt to highlight where it is most important that we should develop coherent answers if the DOI is to succeed in becoming the ISBN for the beginning of the twenty-first century."

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and chugged and begged me to nap.

John Dean, too, had grown woolly I saw on our first bright morning of class: his hair shaggy and white. His spectacles seemed thick, enlarging the eyes to an otherworldly size, and his middle was medicine-ball round.

Dean is a reminder of the days of master-pupil apprenticeships, not only because of his own career, but from his style of teaching as well. He lectures in the traditional sense, but in those lectures are wonderful stories, a full history of the book. Dean talks of seventeenth century bookbinders as if he knew them. He calls them by name as if he'd once hammered for them on "the bench." And in the telling, Dean's voice is so soft and smooth that you might fall into a trance, or you might trace in his words the gentle columns and legends of Alexandria's library.

Born and raised in the UK, Dean's accent is several miles from posh. It's a bit north-country and working class as he defines for us vellum and alum tawny and the precise social and industrial confluences that brought acid to papermaking. He clasps his hands behind himself, rolls back on his heels to gaze at the ceiling and I wonder whether behind those magnified eyes he's gauging history and its brittle consequences, or if the conservator is guessing the composition of the ceiling tiles.

Our class took a field trip to **Cornell**, Dean's home base, to see the preservation machine he created. It is all encompassing — in-house stiffening of paperbacks, commercial binding, a large and well-equipped

conservation lab, traditional microfilming, and the "bleeding edge" of preservation: digital imaging. We met the digital imaging staff in one of Cornell's newest buildings, the Olin Library, built underground, blasted from solid rock. Light flooded even to the lowest levels through open galleries below large skylights. It was a fitting place to discuss digital imaging, pixel problems, and the still unanswered questions of migration and storage costs.

I cannot imagine a preservation operation as efficient or as thorough as Cornell's. What is perhaps more interesting, though, is that this state-of-the-art machine is managed by John Dean, someone who most easily reminds one of the history of the book, the traditions of conservation and librarianship. It is a quality of his heart, I think, that allows this man to span such a range of technology, to lead, to encourage the best in his staff, to ask them to look toward the future and invent the best procedures they can for Cornell. As the course came to a close, I think all his students saw this in him.

Traveling by air, I would have saved myself about eight hours of transportation time. But I went home the way I came, on the train, along the Hudson toward Manhattan, then south toward Washington, glad that I still had a choice between the old way and the new. "No change," Dean said, "is ever sudden or complete or absolute. Papyrus overlapped with parchment for many years, parchment with rag paper, rag paper with wood-pulp."

The train tracks are just uneven enough to make writing difficult but perfectly designed to encourage random, formless, recreational thought.

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