



Article title: Universal Bibliographic Control: Understanding the Mechanism of International standard book Number ISBN

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Introduction

With the invention of printing by movable types and the surge in research development and diffusion (RD&D), the number of publications has gone hell wire. It has become difficult to know and keep track of publications both on and off line. Attempts have been made to bibliographically control world publication output. Bibliographic control could be defined as the art of organizing knowledge for retrieval. When zoomed from the global perspective, the concept of universal bibliographic control (UBC) emerges. Education and book industry are inseparable close allies however many a publisher boycotts some of the ideal processes of book production thus making the noble task of bibliographic control difficult and by that saturating the education community with sub-standard books. This chapter hopes to shade some more light on one of the notable bibliographic control tools, the International Standard Book Number (ISBN).

History of ISBN

ISBN was developed in the middle 1960s by W H Smith, a prominent British book retailer, while he was computerizing management processes, the standard book-numbering system was introduced in the United Kingdom in 1967 and in the United States in 1968; it allowed the UK and US book industries to keep track of all their titles. The UK ISBN system was put before a working group of the International Organization for Standardization (ISO) to investigate its potential as an international bibliographic tracking system. In 1970, ISO approved the ISBN as ISO Standard 2108, a standard that, with revisions, is still in use today. In 2001, a working group was formed to revise the standard and draft its fourth edition. The group increased the length of the ISBN from 10 to 13 digits, incorporating the 3-digit prefixes provided by GS1 (formerly EAN International and the Uniform Code Council), thereby increasing the numbering capacity of the system and making it completely compatible with the GS1 Global Trade Item Number (GTIN-13). The new version of the standard also

specified the metadata that should be supplied at the time of ISBN assignment, developed rules for the administration and governance of the system and specified the registration authority for the standard. The standard now stipulates the use of 13-digit numbers (From Initial 10-digits format). That update was affected in 2005 with the requirement that all ISBNs be converted by 1 January 2007. During 2007, publishers were encouraged to use both forms of their ISBNs to ease the transition process. The change may have been anticipated, but it was not easy for some publishers (Kanel 2008). The question of the need for and feasibility of an international numbering system for books was first discussed at the Third International Conference on Book Market Research and Rationalisation in the Book trade, held in November 1966 in Berlin. At that time, a number of European publishers and book distributors were considering the use of computers for order processing and inventory control, and it was evident that a prerequisite for an efficient automated system was a unique and simple identification number for a published item. The system that fulfilled this requirement and became known as the International Standard Book Number (ISBN) system was developed out of the book numbering system introduced in the United Kingdom in 1967 by J. Whitaker & Sons, Ltd. and in the United States in 1968.

The purpose of the international standard is to coordinate and standardise the international use of ISBNs to identify uniquely one publication or edition of a publication published by one specific publisher in one specific format. The original standard has been revised as book and book-like items begin to appear in new forms of media, and the system is in use today in over 160 countries.

Administration of ISBN

ISBN as one of the tools in Universal Bibliographic Control (UBC) architecture has a global administrative office but ISBN issuance is country-specific, in that ISBNs are issued by the ISBN registration agency that is responsible for that country or territory. The ranges of ISBNs assigned to

any particular country are based on the publishing profile of the country concerned, and so the ranges will vary depending on the number of books and the number, type, and size of publishers that are active. Some ISBN registration agencies are based in national libraries (e.g Nigeria) or within ministries of culture and thus may receive direct funding from government to support their services. In other cases, the ISBN registration service is provided by organizations such as bibliographic data providers that are not government funded.

The administration of the ISBN system is carried out on three levels: international, ISBN registration agency, and publisher.

International administration

The principal functions and responsibilities of the International ISBN Agency are:

- To promote, coordinate, and supervise the worldwide use of the ISBN system
- To represent the interests of the ISBN community to other relevant organisations
- To appoint appropriate organisations as ISBN registration agencies and revoke such appointments as necessary
- To define registration groups and their areas of responsibility and allocate them to appropriate ISBN registration agencies
- To determine the definition of registration group rules that govern the length of available registrant elements within each group and ensure that an accurate and comprehensive register of these rules is available publicly at all times
- To allocate ranges of unique registrant elements within the appropriate registration group to ISBN registration agencies and to maintain a complete and accurate register of the registrant elements that have been assigned
- To secure the maintenance of ISBNs and their associated ISBN metadata through ISBN registration agency registers

- To develop, monitor, and enforce policies and procedures governing the operations of ISBN agencies and the process of ISBN registration by those agencies, including any fees associated with that process
- To facilitate the review and resolution of duplicate assignments of an ISBN
- To review and decide on any appeals relating to decisions made by registration agencies
- To develop, maintain, and make publicly available documentation for users of the ISBN system
- To implement and maintain funding arrangements as necessary to support the operations of the International ISBN Agency, including, but not limited to, financial contributions from ISBN registration agencies.

ISBN Registration Agencies

The administration of the ISBN system within a registration group is the responsibility of the ISBN registration agency. The ISBN registration agency may operate on a national, regional, linguistic, or other reasonable division of responsibility according to the basis of the group allocation. Within a group there may be several national agencies (e.g., group identifier 978-0 and 978-1 have separate agencies in Australia, English-speaking Canada, the United Kingdom, the United States and so on).

The functions and responsibilities of an ISBN registration agency are:

- To ensure that continuous service is provided
- To issue notification of the assignment of an ISBN or an ISBN registrant element to the registrant of that monographic publication or publisher name
- To create, manage, and maintain registers of ISBN, ISBN metadata, and administrative data in accordance with the policies set out by the International ISBN

Agency. (Tasks involving ISBN metadata may be delegated to a designated bibliographic agency provided that compliance is made with these specifications)

- To correct inaccurate ISBNs and ISBN metadata if proof of such inaccuracy is provided
- To make ISBN and associated metadata available to other registration agencies and to users of the ISBN system in compliance with policies set out by the International ISBN Agency
- To collate and maintain statistical data on its ISBN-related operations and report these at the stipulated intervals to the International ISBN Agency
- To promote, educate, and train others in the use of the ISBN system in compliance with the specifications of the applicable edition of the ISBN standard in force at the time
- To adhere to the ISBN policies and procedures established by the International ISBN Agency in compliance with the specifications of the applicable edition of the ISBN standard in force at the time

Publisher Administration

Publishers are responsible for assigning publication elements to the individual items they publish and for ensuring the application of pertinent regulations. They may apply for and receive a registrant element from an ISBN registration agency together with a printout or electronic file of the individual ISBNs that are available to them within the allocated registrant element. Some ISBN registration agencies may charge a fee for these services. The ISBN registration agency will determine the range of publication elements that will be available to the publisher. The range assigned will be determined based on current and anticipated future publication output and is directly related to the length of the registrant element allocated. The publisher should ensure that the ISBN registration agency has as much

information as possible about all available backlist publications and should advise the agency of all present and future publications in order for the assignment of a suitably sized registrant element.

The publisher should supply the ISBN registration agency (or its designated local bibliographic agency) with a specified amount of metadata about the publication to which the ISBN is assigned. The specifications concerning the type and format of the metadata are established by the International ISBN Agency in cooperation with the ISBN registration agencies

The Function and Scope of the ISBN

The number is recognised in more than 160 countries throughout the world, the International Standard Book Number is a short and clear identifier that is potentially machine-readable. The ISBN denotes a particular monographic publication uniquely and should, therefore, be associated with it from early production stages. An essential instrument in production, distribution, sales analysis, and bibliographic data storage systems in the book trade, ISBN is also of vital importance to library information management. However, where a product is appropriate for another specific numbering system (such as continuing resources and ongoing integrating resources which qualify for the ISSN, and printed music which qualifies for the ISMN), then that system must be used. If appropriate, such identifiers should be used in conjunction with the ISBN. Monographic series such as the national bibliography of Nigeria uses both ISBN and ISSN

ISBNs are assigned to monographic publications, including related products such as publications available as sets or as completed series that are available to the public, whether those publications and related products are available on a costless basis or to purchase. In addition, individual sections (such as chapters) of monographic publications or issues or articles of continuing resources that are made available separately may also use the ISBN as

an identifier. Provided that the publication qualifies for ISBN assignment, it is of no importance in what physical form the content is documented and distributed; however, each product form should be identified separately.

Examples of types of monographic publications to which an ISBN shall be assigned are:

- Printed books and pamphlets
- Braille publications
- Publications that are not intended by the publisher to be updated regularly or continued indefinitely
- Individual articles² or issues of a particular continuing resource (but not the continuing resource in its entirety)
- Maps
- Educational/instructional films, videos and transparencies
- Audiobooks on cassette, or CD, or DVD (talking books)
- Electronic publications either on physical carriers (such as machine-readable tapes, diskettes, or CD-ROMs) or on the Internet (for download or streaming)
- Digitised copies of printed monographic publications
- Microform publications
- Educational or instructional software
- Mixed media publications (where the principal constituent is text-based)

Publications may comprise more than one volume, and in these cases an ISBN must be assigned to cover the entire set. Where individual volumes of the set are available separately, each volume must be assigned a unique ISBN to identify it. The verso of the title page (or an equivalent position in a non-print version) in each case should clearly display the ISBN for the set as a whole as well as the ISBN for that particular volume.

Even if the multiple volume publication will only be available as a complete set, the assignment of a separate ISBN to each individual volume is still recommended. Doing so will facilitate various stages of transaction processing, including the handling of shipments when not all volumes are simultaneously published or distributed and the supply of replacements in the case of damaged copies. Where individual articles are made available separately by a publisher, they qualify as monographic publications and shall be assigned an ISBN. This does not apply in the case of offprint or preprint copies that are ordered by the author(s) of the article for their own distribution purposes. A publication that is issued over time with no predetermined conclusion, such a publication is usually issued in successive or integrating issues, which generally have numerical and/or chronological designations. Typical examples include serials such as newspapers, periodicals, journals, magazines, etc., and integrating resources such as updating loose-leaf publications and updating websites.

Some examples of the types of material to which an ISBN shall NOT be assigned are:

- Continuing resources treated in their entirety as bibliographic entities (individual issues may qualify for ISBNs)
- Abstract entities such as textual works and other abstract creations of intellectual or artistic content
- Ephemeral printed materials such as advertising matter and the like
- Printed music
- Art prints and art folders without title page and text
- Personal documents (such as an electronic curriculum vitae or personal profile)
- Greetings cards
- Music sound recordings
- Software that is intended for any purpose other than educational or instructional
- Electronic bulletin boards

- E mails and other electronic correspondence
- Games

Where one qualifying product is made available accompanied by a secondary item that does not itself qualify for ISBN, then one ISBN should be used to identify the items in combination, and another ISBN to identify the qualifying product if it is also available separately. However, as it is outside the scope of ISBN, an ISBN shall not be used to identify the secondary element if it too is made available separately.

Some identifiers such as the ISSN and ISMN have precise rules as to the scope of materials that qualify for assignment whereas some other identifiers, such as GTIN-13 for trade items, may be used across very broad product ranges.

As the ISBN is now fully compatible with GTIN-13 this makes it more convenient for retailers to sell products of related interest, that do not qualify for ISBN and which use the GTIN-13 instead, without having to adapt their systems.

Guidelines for the assignment of ISBN in Nigeria

- A formal application for the assignment of ISBN made on the letter head paper of publisher, author/publisher or institution
- Attach a photocopy of certificate of registration of the publisher obtained from the corporate affairs commission.
- An indication whether an author, publisher or institution is new in the publishing industry and their envisaged output in the next five years to enable the agency determine the appropriate block of numbers to assign to them.
- Visual proof of the existence of the publication (the user requesting the assignment must produce type-set copy of the manuscript or at least the preliminary of the title to be published). This is mandatory for authors and publishers.

- An evidence to show full utilization of ISBN earlier assigned, precisely each publisher, author or institution should forward a list of their publications with the used ISBN. In addition, evidence of having deposited three (3) ten (10) or twenty five (25) copies of each publication by the private publishers, state government: ministries , parastatals and agencies and Federal government: ministries, parastatals and agencies as the case may be to the national library as required by the legal deposit law

Structure of the ISBN

Since 1st January 2007, national ISBN agencies only provide ISBNs that consist of 13 digits, comprising the following elements: Prefix element; Registration group element; Registrant element; Publication element and Check digit. When printed, the ISBN is always preceded by the letters “ISBN”. In countries where the Latin alphabet is not used, an abbreviation in the characters of the local script may be used in addition to the Latin letters.

The ISBN is divided into five elements, three of them of variable length; the first and last elements are of fixed length. The elements must each be separated clearly by hyphens or spaces when displayed in human readable form: ISBN 978-0-571-08989-5 or ISBN 978 0 571 08989 5. The use of hyphens or spaces has no lexical significance and is purely to enhance readability. The number of digits in the second, third, and fourth elements of the ISBN (registration group element, registrant element, publication element) varies. The length of the registration group element and of the registrant element is relative to the anticipated publishing output of the registration group or registrant. When these elements are short in length it indicates that the output of the registration group or the registrant (or both) is expected to be a large number of publications.

Prefix element

The first element of the ISBN is a three-digit number that is made available by GS1, formerly European Article Number (EAN) International. Prefixes that have already been made

available by GS1 are 978 and 979, but there may be a further prefix allocation made in the future as required to ensure the continued capacity of the ISBN system.

Registration group element

The second element of the ISBN identifies the country, geographical region, or language area participating in the ISBN system. Some members of the ISBN system form language areas (e.g., registration group number 3 = German language group within prefix element 978); others form regional units (e.g., registration group number 982 = South Pacific within prefix element 978). The length of this element varies but may comprise up to 5 digits. Registration group elements are allocated by the International ISBN Agency.

Registrant element

The third element of the ISBN identifies a particular publisher or imprint within a registration group. The length of this element varies in direct relationship to the anticipated output of the publisher and may comprise up to 7 digits. Publishers with the largest expected title outputs are assigned the shortest registrant elements and vice versa. Potential registrants apply to the ISBN group agency responsible for the management of the ISBN system within the country, region, or language group where they are based in order to be assigned registrant elements that are unique to them. Once they have exhausted the allocation of ISBNs that is linked to their registrant element, they may be assigned an additional registrant element providing further allocations of ISBNs.

Publication element

The fourth element of the ISBN identifies a specific edition of a publication by a specific publisher. The length of this element varies in direct relationship to the anticipated output of the publisher concerned and may comprise up to 6 digits. Publishers with the largest expected title outputs are assigned the longest publication elements and vice versa. To ensure that the correct length of the ISBN is maintained, blank digits are represented by leading zeros.

Check digit element

The fifth element of the ISBN is the check digit. This is calculated using a modulus 10 algorithm. An International Standard Book Number consists of 4 parts (if it is a 10 digit ISBN) or 5 parts (for a 13 digit ISBN). In the following 10-digit ISBN 0 912843 07 1, the first digit, 0, indicates that the book was published in an English-speaking country; the digits 912843 represent the publisher (Palmgroove, Inc.); 07 are the identifying numbers that Palmgroove has assigned to the book; the final digit, 1, is called the check digit of the ISBN.

To obtain the ISBN check digit:

Step1

Multiply the first nine digits of the ISBN by 10, 9, 8, 7, 6, 5, 4, 3, and 2, respectively, and then compute the sum of these nine products.

Step2

Find the remainder when this sum is divided by 11.

Step3

Subtract the remainder from 11 to determine the check digit. [NOTE: So that each possible check digit is a single digit, a check digit of 10 is written as X and a check digit is assigned the value of 0 if there is a remainder of 0.] Formally, using modular arithmetic, we can say:

For the ISBN 0-912843-07-1 that is discussed above:

$$1. 10(0) + 9(9) + 8(1) + 7(2) + 6(8) + 5(4) + 4(3) + 3(0) + 2(7) = 197$$

$$2. 197 = 11(17) + \text{a remainder of } 10.$$

$$3. \text{Check digit} = 11 - 10 = 1. \text{ (It checks!)}$$

The 13-digit ISBN is calculated using a different formula. The ISBN-13 check digit, which is the last digit of the ISBN, must range from 0 to 9 and must be such that the sum of all the thirteen digits, each multiplied by its (integer) weight, alternating between 1 and 3, is a multiple of 10. The calculation of an ISBN-13 check digit begins with the first 12 digits of

the thirteen-digit ISBN (thus excluding the check digit itself). Each digit, from left to right, is alternately multiplied by 1 or 3, then those products are summed modulo 10 to give a value ranging from 0 to 9. Subtracted from 10, that leaves a result from 1 to 10. A zero (0) replaces a ten (10), so, in all cases, a single check digit results. For example, the ISBN-13 check digit of 978-0-306-40615-? is calculated as follows:

$$s = 9 \times 1 + 7 \times 3 + 8 \times 1 + 0 \times 3 + 3 \times 1 + 0 \times 3 + 6 \times 1 + 4 \times 3 + 0 \times 1 + 6 \times 3 + 1 \times 1 + 5 \times 3$$

$$= 9 + 21 + 8 + 0 + 3 + 0 + 6 + 12 + 0 + 18 + 1 + 15$$

$$= 93$$

$$93 / 10 = 9 \text{ remainder } 3$$

$$10 - 3 = 7$$

Thus, the check digit is 7, and the complete sequence is ISBN 978-0-306-40615-7.

Benefits of the ISBN

- The ISBN is a unique international identifier for monographic publications; assigning a number replaces the handling of long bibliographic descriptive records, thereby saving time and staff costs and reducing copying errors.
- Correct use of the ISBN allows different product forms and editions of a book, whether printed or digital, to be clearly differentiated, ensuring that customers receive the version that they require.
- The ISBN facilitates compilation and updating of book-trade directories and bibliographic databases, such as catalogues of books-in-print. Information on available books can be found easily.
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- The ISBN is machine-readable in the form of a 13-digit EAN-13 bar code. This is fast and avoids mistakes.

- The ISBN is required for the running of electronic point-of-sale systems in bookshops.
- Many publishing and supply chain systems are based on ISBN
- The accumulation of sales data is done by the ISBN. This enables the varying successes of different product forms and editions of publications to be monitored, as well as enabling comparisons between different subject areas and even different publishing houses.
- The national lending right in some countries is based on the ISBN. Such schemes enable authors and illustrators to receive payments proportionate to the number of times that their books are lent out by public libraries.

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