



International Federation of
Library Associations and Institutions

Common Practices for National Bibliographies in the Digital Age

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April 2022

Endorsed by the IFLA Professional Council



International Federation of Library Associations and Institutions (IFLA), 2021

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1 Introduction: Background and history

The dramatic growth of digital media over the past decades has called into question many key assumptions on which the constitution and dissemination of national bibliographies was founded. Accurate guidance on current common practice is therefore needed to assist those seeking information for creating and maintaining a national bibliography.

1.1 Purpose

This resource is not intended to be prescriptive, since bibliographic control varies widely from country to country and local requirements may be influenced by financial, legal or practical constraints. A number of potential options are presented to enable their application to be tailored according to circumstances, with examples and use cases given to illustrate the possible range of approaches.

The intended audience for this resource includes:

- Those managing existing national bibliographic services
- Those implementing new national bibliographies
- Staff of national bibliographic agencies (NBAs) wishing to respond to the opportunities and challenges posed by new technologies and media.

1.2 Publication and updates

This resource consists of five sections addressing the different issues facing NBAs. Considering that the environment continues to evolve, this resource will be updated regularly by the Bibliography Section to reflect changes in common practice. New versions and updates will be published on the Section's pages on the IFLA website.

1.3 History

The *Common Practices for National Bibliographies in the Digital Age* builds on the web publication *Best Practice for National Bibliographic Agencies in a Digital Age* (2014-2017), itself based on the original printed *National Bibliographies in the Digital Age: Guidance and New Directions* (2009; <https://www.ifla.org/national-bibliographies-in-the-digital-age-2009-summary/>), created by the IFLA Working Group on Guidelines for National Bibliographies. The working group was originally established in 2002 to develop guidelines:

- To help national bibliographic agencies start or improve bibliographic services
- For publishing bibliographies in electronic form
- On the inclusion and presentation of electronic resources in national bibliographies.

Following publication of the printed text in 2009, work began on a new edition. However due to the rapidly changing nature of the subject matter and the information landscape the decision was subsequently made to channel future efforts into the creation of a new web based resource and this was announced at the Standing Committee's [Warsaw satellite meeting](#) to the IFLA 2012 World Congress. The mini-website was created in 2014 and officially launched at the 2015 WLIC in Cape Town.

In 2017, recognising that the need to update the resource would continue, and websites would continue to evolve, the Bibliography Standing Committee decided to revert to a single-document version, for ease of use. The preferred format would be a text document for revisions and translations, and a PDF for dissemination, as the fragmented nature of the mini-website, while useful for a quick reference to a specific piece of information, didn't lend itself as readily to sustained reading or revision and translation work.

Project meetings were held in Paris in 2017 and Barcelona in 2018. The name was changed to *Common Practices for National Bibliographies in the Digital Age* to reflect that bibliographies must serve the needs of the audience and therefore be adapted to local context (see 1.1 *Purpose* above). There is no single "Best practice" but many good practices.

2 Organisation

2.1 Introduction

The purpose of this section is to introduce the key issues and decisions required when establishing or restructuring an agency with responsibility for exercising national bibliographic control. The key issues are described in general terms and illustrated with examples from national bibliographic agencies. Every context is unique, and the intention is not to present an inflexible list of instructions. Instead, the emphasis is on offering options and identifying the strengths and weaknesses of different approaches.

Every country has some unique requirements for which provision has to be made and these should be the focus of local activity. However, countries without current experience of national bibliographic work should actively seek advice from existing practitioners since many useful lessons can be learned from their experience.

- Attending or hosting a regional workshop bringing together expert practitioners and providing a context for local knowledge can be a good starting point.
- If possible, select an experienced partner for long-term cooperation. The choice of partner should reflect the specific requirements and national context of the agency.

Hiring or requesting technical assistance from a local, regional or international community may be a good way of advancing rapidly from planning to implementation. This conforms with the International Conference on National Bibliographic Services ([ICNBS](#)) recommendation 19:

Where needed, IFLA should assist national bibliographic agencies to develop their national bibliographic activities - for example: establishing pilot schemes to develop national bibliographies, establishing guidelines for producing national bibliographies, and organizing national, regional or international seminars and training workshops.

2.2 Responsibilities of a national bibliographic agency

The national bibliographic agency (NBA) is

the organizational unit established within a country's library system, which undertakes responsibility for the preparation of the authoritative and comprehensive bibliographic records for each new publication issued in the country, making the records in accordance with accepted international bibliographic standards and publishing them with the shortest possible delay in a national bibliography, which appears on a regular basis.

International Federation of Library Associations, IFLA International Office for UBC, & UNESCO, 1979.

It should be stressed that there is no single “correct” administrative model for an NBA. However, it is important that the agency:

- Possess the authority required to establish and maintain national bibliographic control
- Be suitably resourced at a level reflecting its responsibility for national bibliographic control.

In practice, agencies undertaking the national bibliographic control function may be designated by a variety of names and organised in accordance within a range of administrative structures, e.g.:

- A department, division or section of a national library
- A processing centre serviced by multiple specialist national libraries
- A national bibliographic centre (or institute).

National responsibility for application and maintenance of bibliographic standards is often assigned to the national bibliographic agency due to its expertise and authority. Workflows for assigning identifiers such as [ISSN](#) or [ISBN](#) also overlap with national bibliographic control. NBAs should therefore take a lead in this area but seek cooperation with other bibliographic communities and make use of national expertise.

For newly established national bibliographies the priority should be to record as much as possible of the current national output before, as resources allow, moving on to record older publications. Even for established national bibliographies retrospective coverage can be a challenge. Since the extension of legal deposit lags behind the expansion of media, there will always be carriers of information that have not been collected because they were produced prior to the legal deposit legislation coming into effect.

2.3 Location of the national bibliographic agency

While there is agreement that national bibliographic control is the responsibility of the national bibliographic agency there is no consensus on where the agency should be located. The functions of the NBA are often undertaken by the national library. However, administrative practices may vary considerably between countries with either individual activities (e.g. Cataloguing in publication) being outsourced on a contract basis or the entire function being undertaken by a private company (e.g. [Dansk Biblioteks Center](#) in Denmark, [Bibliographic Data Services Limited \(BDS\)](#) in the United Kingdom).

2.3.1 The national library as national bibliographic agency

The IFLA National Libraries Section defines the tasks of a national library in the following manner:

National libraries have special responsibilities, often defined in law, within a nation's library and information system. These responsibilities vary from country to country but are likely to include: the collection via legal deposit of the national imprint (both print and electronic) and its cataloguing and preservation; the provision of central services (e.g., reference, bibliography, preservation, lending) to users both directly and through other library and information centres; the preservation and promotion of the national cultural heritage; acquisition of at least a representative collection of foreign publications; the promotion of national cultural policy; and leadership in national literacy campaigns.

National libraries often serve as a national forum for international programmes and projects. They may have a close relationship with national governments, may be concerned with the development of national information policies, and may act as a conduit for the views of other sectors of the profession. Occasionally they also serve the information needs of the legislature directly.

The defining characteristics of a national library therefore make it the most appropriate choice to host the national bibliographic agency. National libraries have national responsibility, often enshrined in law. This gives them the authority to negotiate with publishers and trade representatives on legal deposit, digital rights managements and other issues of national

significance. This role affords national libraries the security to plan for the long term. The national library may also be relatively well resourced to provide leadership and to manage sustainable services.

There is no consensus on whether the national bibliography should be a separate file or in the catalogue of the national library. Different solutions will be appropriate to different national circumstances. If the national bibliography is a part of the catalogue, users should be able to search on that segment. Irrespective of the way in which national bibliographic data is organised, it is recommended that the national bibliography is presented as a separate view, distinct from any institutional or union catalogue.

Further information on how a national bibliography integrates into a wider portfolio of bibliographic services is presented throughout this document.

2.3.2 National bibliographic agencies in other institutions

In many countries national libraries are also institutional libraries serving a university, the public, or a legislature. Such libraries possess valuable resources in terms of collections, staff and experience which will benefit the national bibliographic agency. Assigning the functions of the national bibliographic agency to an institutional library can therefore be very effective.

However, the mission, users, tasks and services of the host institution will inevitably be affected by assuming responsibility for national bibliographic control. There is a risk that national functions may suffer under the pressures of maintaining services to the host institution. It is important therefore to ensure national bibliographic functions are adequately resourced.

Management structures must ensure performance is monitored and a distinction is maintained between national and institutional roles with responsibilities for each aspect of the service being clearly defined.

2.3.3 Independent national bibliographic agencies

An NBA may be established as an independent agency, with responsibility for processing the national published output. While there are examples of highly successful independent agencies (such as [Dansk Biblioteks Center](#)), there may be a risk that an independent agency may lack the authority and resources necessary to manage an effective bibliographic service. Inevitably, an independent agency will need to work closely with the institutions responsible for managing national collections. Even if the NBA is administratively independent, there are strong arguments for its physical collocation with the national library or other national collection.

2.4 Collaboration and the national bibliographic agency

2.4.1 Collaborative and distributed agencies

Responsibility for national bibliographic control is often distributed among agencies responsible for different types of material, e.g. texts may be the responsibility of the national library, while film and television are the responsibility of the national film archive. Responsibilities within these different domains may be centralised, further delegated or distributed. In many countries several libraries receive legal deposit copies and these organisations may also share responsibility for creating the national bibliography.

A collaborative or distributed structure can mobilise scattered resources and direct them toward the common purpose of bibliographic control. Sharing responsibility spreads the burden of managing the legal deposit system but it may be difficult to maintain consistency and standardisation in a distributed system.

Despite the challenges involved, collaborative models are becoming increasingly important as resources diminish and no single institution can collect everything. In such cases it is

recommended that an editorial board with representatives from the institutions involved should be established to oversee the management and development of the national bibliography. This board should have expertise in legal deposit issues as well as bibliography to ensure a comprehensive approach to bibliographic control.

Strong leadership and good communication will be necessary to involve partners in contributing towards the common goals and to manage change. Management structures must ensure that, even in a distributed model, responsibilities are clearly defined and performance levels are closely monitored via the establishment of controls and indicators.

2.5 Co-operation with publishers and media producers

Efficient co-operation with publishers, media producers, and distributors is very important for a successful and sustainable national bibliography for a number of reasons:

- Publishers and media producers are a primary source of information for the national bibliography.
- The successful operation of legal or voluntary deposit depends on publisher co-operation.
- Publishers together with other taxpayers have a right to expect that the NBA processes resources deposited securely and efficiently.

Publishers should benefit from a successful national bibliography via higher visibility for their publications.

2.6 Business models

The choice of business model depends on the users and goals of the national bibliography, the resources available to produce it, and the organisational or political context of the national bibliographic agency. For example, decisions on whether to charge for the bibliography or associated products may be affected by the ability and willingness of potential clients to pay. The particular prices and methods of charging may need to balance an ability to generate revenue with that of attracting (or not deterring) potential customers.

The business model should take account of the direct costs, such as marketing, production and distribution. The costs of implementing the national bibliographic service should be considered as capital costs and separated from the recurring costs for delivering the service. The extent to which indirect costs, such as claiming, cataloguing and overheads are included in the recurring costs will very much depend on the context in which the national bibliography is being created. The context will also determine the terms on which the national bibliography is offered.

2.6.1 Users and requirements

In order to select an appropriate business model an NBA should first identify its potential users and their requirements for a national bibliography.

Users can include:

- Librarians, for purposes of bibliographic verification, acquisitions and metadata sharing
- Booksellers for bibliographic verification and ordering
- Publishers as a marketing or promotional aid and as a way to obtain standardised metadata including identifiers
- Bibliographic utilities who remarket bibliographic records to libraries and the book trade for profit

- Online information aggregators who rely on authoritative metadata such as Wikipedia and Google Scholar
- General public as a general awareness tool for new publications
- Historians, bibliographers and other researchers as an aid to research, both current and retrospective
- International foreign researchers, libraries, publishers, booksellers who seek access to the publications of the country in question.

Requirements can include:

- A list of the country's intellectual output
- A comprehensive list of all titles published in a country, to provide a record of their existence and to unambiguously identify them
- A comprehensive list of all publications for statistical purposes, for use in monitoring publishing as a cultural industry
- A partial list of significant titles published in a country, for specialised uses or clients
- A current awareness service to alert readers when publications in their sphere of interest are published in the country
- A retrospective record of the publishing history of a country during the course of the country's history
- Accessibility features for readers with print disabilities.

2.6.2 Charging for services

A key question for national bibliography services is determining whether the national bibliography will be free or have a fee. In some cases, a national library as a government agency may have requirements to provide services for free. In other cases, the library may need to recover some costs in order to provide desired level of services. Levying a fee for bibliographic information and services can add barriers to reuse of metadata; ideally, services and data should be free when possible. Government policy and national competition policy may determine whether and at what level a charge may be levied.

Some governments do not allow national bibliographic agencies, which are also government agencies, to keep the revenue generated by selling national bibliographic products. For these and other reasons, it is important to articulate the purpose and scope of the national bibliography before developing a business model.

2.6.3 Priced services

For any national bibliographic service, it is vital to understand the costs and the potential market, but it is particularly important if the service is to be supported in whole or part by charges. Differential pricing structures can ensure that access for schools and those less able to pay, such as students, the unwaged, is subsidised by those better able to afford it.

NBAs offering priced services must therefore:

- Create an affordable service portfolio
- Control their costs rigorously
- Seek opportunities to deliver services using the most efficient technologies
- Ensure that priced products and services do genuinely recover direct costs

- Discontinue services and products that fail to return a profit.

A range of services and products can be offered by the national bibliography, e.g.:

- Machine-readable current bibliographic records for users such as bibliographic utilities, libraries and booksellers
- Copies of the national bibliography in any physical format via annual subscriptions
- Bibliographic records for retrospective conversion purposes
- Value-added services, e.g. current awareness data; statistics or subsets tailored to specific user profiles.

2.6.4 Free or open services

National bibliographic services are offered free of charge in many countries as a public good, the business case being founded on the stimulation free access to information gives to the educational, cultural and economic life of the nation. Other libraries and national agencies may obtain economic benefit by reusing bibliographic data produced for the national bibliography. The cost is usually underwritten by the national government.

Increasingly government policy may determine that information paid for from public funds should be offered to the nation under open licensing and free of charge. Funding may be also be attracted from different government departments or agencies, such as education, culture, trade and innovation.

2.6.5 Mixed models

An NBA may determine that it is appropriate to offer a mixed portfolio of free and priced services depending upon the resources required to deliver them. For example, a basic offering of an online web catalogue might be made freely available while individually tailored or added value services to specific users could be priced. Alternatively, embargoes may exist for records licensed from commercial third parties that prevent their being offered freely until a specified period has passed. The financial and political environment in which the NBA operates will inevitably determine the range of options available in this area.

2.7 Examples

2.7.1 Canada

The Canadian national bibliography, [Canadiana](#), includes publications produced in Canada, or published elsewhere but of special interest and significance to Canadians. It was published as a monthly printed bibliography from 1953, then on Computer Output Microfiche, and later as an annual CD-ROM. The CD-ROM, microfiche and printed versions ceased in the 1990s. From that point, the Library's online catalogue was viewed as constituting the cumulative national bibliography. The Library's catalogue since 2018 is [Aurora](#) and it is included in the national union catalogue Voilà. Both are hosted on OCLC WorldCat Discovery Service.

A MARC Records Distribution Service (MRDS) to distribute Canadiana MARC records to libraries and other subscribers began in the 1970s, and the Canadiana records were made available online in the 1980s. As of 2019, the full [MARC Records Distribution Service](#) ceased, but bibliographic records for selected resources on the Government of Canada Depository Services Program weekly acquisitions lists of federal government publications are freely available as [downloadable MARC 21 files](#).

[Library and Archives Canada](#) (LAC) is the national bibliographic agency for Canada. As it is a department of the federal government, any revenues previously generated from *Canadiana* were added to the General Revenue Fund on behalf of the people of Canada, and not directly added to the library's budget.

The business model for *Canadiana* has changed over time:

- A moderate price was charged for subscriptions to the *Canadiana* print, microfiche or CD-ROM products, as well as for the MRDS MARC records service.
- Downloading MARC records from the former online catalogue, AMICUS, was originally by subscription; however, charging for this service was suspended in 1997, and MARC records were provided free of charge through the catalogue. Records were also freely available via Z39.50 protocol.
- AMICUS has been superseded by Aurora as the LAC public catalogue. *Canadiana* MARC records are now only available to libraries with a cataloguing subscription to OCLC WorldCat. LAC covers the cost of subscriptions for qualified small public and academic libraries.

2.7.2 France

The [Bibliothèque nationale de France \(BnF\)](#) is the national bibliographic agency for France. The [Bibliographie nationale française](#) has been published since 1811. It includes publications from French publishers, printed in France or imported into the country in more than 100 copies. Since 2001, the bibliography has appeared as a distinct publication on the BnF website, divided into five parts (Books, Serials, Audio-visual materials, Music and Cartography), each with different frequencies: individual records in these are freely available and downloadable. The records are also accessible via Z39.50 and SRU.

The BnF also provides a MARC records distribution service, offering records in both UNIMARC and INTERMARC formats on a subscription basis. This service is offered for a fee; however, French public libraries are not required to pay the fee. Retrospective files or customised files are also possible, for variable prices.

Irrespective of the protocol used to access records, the BnF has stated a principle of offering records from its catalogue as well as from the national bibliography free of charge when individual users download them. The BnF has publicised its legal framework for bibliographic records usage on its website. The main points are:

- Any person extracting bibliographic records from the BnF database can freely use, adapt, modify and distribute them as long as they are included in a value-added derived product or service.
- In return of this free use, the customer commits to permanently store, in an appropriate field of the computer record, the reference of the source.

The transfer of bibliographic records taken from the BnF to a third party is not allowed unless changes have been made by the user to produce a value-added product or service.

2.7.3 Italy

The [Bibliografia nazionale italiana](#) (BNI) describes the resources published in Italy and received by the National Central Library of Florence, according to the legal deposit rule. It is currently published in four series: Monographs (monthly); Printed music (biannual); Periodicals (biannual); theses (biannual). The issues of BNI, digital since 2012, can be downloaded in PDF, UNIMARC, and XML, since 2015. The BNI is published and disseminated on the BNCF website in open access.

2.7.4 Lithuania

The [Lithuanian national bibliography](#) includes publications from Lithuanian publishers, by Lithuanian authors and on Lithuanian topics. The current national bibliography was published as a monthly printed bibliography from 1928 to 1943 and from 1947 to the present.

UNIMARC-based records of the national bibliography began in 1998 and at present bibliographic records of Lithuanian documents and documents related to Lithuania are available online for free without limitations.

The [National Library of Lithuania](#) has been performing the role of the national bibliographic agency for Lithuania since 1992. The business models for the Lithuanian national bibliography are the following:

- UNIMARC records, online in the National Bibliographic Data Bank as well as in the catalogue of the national library, are free of charge. Those records are also available via Z39.50

A moderate price is charged for a subscription to the published national current and retrospective bibliography. Subscribers to this service include academic and public libraries, as well as other institutions in Lithuania and worldwide.

2.7.5 Sweden

The Swedish national bibliography, *Svensk bokförteckning*, was published in printed form until 2003. The compilation of the national bibliography was carried out by [Kungliga Biblioteket](#) ([National library of Sweden](#)), but the product was sold through the publisher Tidningsaktiebolaget Svensk bokhandel and distributed through Seelig.

From 2004 the national bibliography has been accessible as part of [Libris](#), the national union catalogue of research libraries. Access to Libris together with downloading of records has always been cost free. Because the national bibliographic agency is funded by the government to create national records, charging for records has therefore never been seriously considered. In addition, the records created by the National Library of Sweden are in some instances based on other libraries' cataloguing, which would make charging complex.

2.7.6 Switzerland

[The Swiss Book](#) is the national bibliography of Switzerland published by the [Swiss National Library](#) (SNL). This bibliography lists all Swiss publications in all media: books, maps, printed music, electronic media and multimedia, periodicals, newspapers, annual publications and series. A publication is considered Swiss if any of the following applies:

- At least one third of the authors are Swiss
- The publishing house is Swiss
- At least one third of the content concerns Switzerland.

A publication is included in *The Swiss Book* if any of the following applies:

- Its content is public
- It has at least 6 pages
- It is less than 10 years old.

Publications whose content is the work of Swiss translators, compilers (editors) or contributors or by authors residing in Switzerland, are collected by the Swiss National Library but are not included in *The Swiss Book*.

The Swiss Book is accessible online in different versions. Access has been cost-free since issue 2001. The search interface is part of [Helveticat](#), the online catalogue of the SNL: search functionalities are therefore identical to those of online catalogues, e.g. by author, title, keyword. Documents may be ordered and borrowed online and bibliographies can also be prepared.

The printed subscription-based edition of the bibliography was discontinued in 2007 when it was replaced by a downloadable PDF version which largely reflects the traditional printed version.

The Swiss Book in [PDF form](#) is a bi-monthly publication.

2.7.7 United Kingdom

New books and serials have been recorded in the [British National Bibliography](#) (BNB) since 1950. The scope has been extended to electronic publications following the extension of legal deposit to this class of material in 2003. The *British National Bibliography* also includes details of forthcoming books. Under the [UK Cataloguing-in-Publication Programme](#) (CIP) information on new titles appears up to 16 weeks ahead of the announced publication date.

The *British National Bibliography* is published by the [British Library](#). From 2009 it has been freely available on line through the British Library's Main Catalogue. The British Library offers a range of free and priced options to users.

2.8 Legal deposit

For most countries the most effective way of collecting the national output is via a legal deposit scheme. The [International Conference on National Bibliographic Services \(ICNBS\)](#) reaffirmed *"the value of legal deposit as a means of ensuring that the cultural and intellectual heritage and linguistic diversity of the State is preserved and made accessible for current and future users."*

National bibliographic agencies working with publishers or legislative bodies to create legal deposit agreements should be guided by the [IFLA/UNESCO Guidelines for legal deposit legislation](#).

Legal deposit schemes may vary in their form but include:

- Statutory legal deposit
- Voluntary deposit
- Mixed deposit.

2.8.1 Statutory legal deposit

Legal deposit as a statutory obligation requires publishers, distributors and, in some countries, printers to freely provide copies of their publications to the national collection. In many countries this scope is being extended to include electronic resources together with other forms of non-print media.

Legal deposit legislation can also impose obligations on the national bibliographic agency relating to material received via legal deposit concerning:

- Long term preservation
- Description
- Access
- Restrictions on the use or disposal of such material.

2.8.2 Discrete or incorporated legislation

In some countries, legal deposit is the subject of discrete legislation; in others, provision for legal deposit may be incorporated into another act or law (e.g. the national library act). Experience

shows that a discrete legal deposit act is more effective than legislation which forms a small part of another legislative matter (e.g. a freedom of expression act).

A legal deposit act generally establishes the basic principles of legal deposit. It is usually accompanied by regulations or another type of legal instrument that specifies the details of the system, such as the categories of material to be deposited, the number of copies, timeliness, etc. Irrespective of the type of legislation, the act must address compliance and provide mechanisms for extending the scope of deposit to new media.

2.8.3 Introduction of legislation

The ICNBS recommendation number 2 states that countries presently without legislation are urged to introduce it. There is also a recommendation for evaluating legal deposit legislation to make sure that it meets present needs. Generally speaking, older legislation tends to leave out newer types of materials, such as audio-visual or electronic materials.

Recommendation 3 from ICNBS summarises requirements for legal deposit legislation:

New deposit laws, or regulations pursuant to such laws, should state the objective of legal deposit; should ensure that the deposit of copies is relevant to achieving the goals stated above; should be comprehensive in terminology and wording to include existing types of materials with information content and others which may be developed; and should include measures for enforcement of the laws. Such legislation may take into account the possibility of sharing responsibility for deposit among more than one national institution.

In general, all types of published material should be subject to legal deposit regardless of format. This includes audio-visual material and online electronic documents. If any forms of publications are left out it should be on the grounds of content, not information carrier.

2.8.4 Number of copies

The number of copies to be deposited varies significantly from country to country. There is a general tendency to reduce rather than increase the number of copies deposited. This is based on the evidence that producers of information are more reluctant to deposit when the number of copies is high and especially when the documents are expensive to produce. The [*IFLA/UNESCO Guidelines for Legal Deposit Legislation*](#) suggest that a minimum of two copies should be deposited, one for preservation and the other for public use.

2.8.5 Enforcement

Many countries report that they do not have provisions for enforcing legal deposit legislation. Enforcement of deposit, whether legal or voluntary, is a problem. Deposit is an expense which some publishers would prefer to avoid. IFLA recommends that legal deposit laws should include mechanisms for enforcement.

The national bibliographic agency needs the sanction of the law to meet its responsibilities, but enforcement is generally viewed as the last resort. Imposing penalties on publishers does not encourage their participation in bibliographic control. Penalties lose their deterrent effect when they fail to keep up with inflation.

Experience in the United Kingdom suggests that prompt claiming has a significant impact on compliance. In some countries, copyright registration offers an incentive for publishers to deposit. National bibliographic agencies should encourage deposit through the efficiency and timeliness of their operations and aim to develop good relations with publishers. However, publishers must be made aware of their obligations and the public good and commercial benefits of timely deposit must be emphasised.

2.8.6 Voluntary deposit

“Voluntary deposit” is an agreement by which publishers commit to deposit material with the national bibliographic agency in the absence of a formal statutory requirement. The national bibliographic agency may also make commitments relating to the agreement concerning the description, long term preservation and access to material received. An effective voluntary agreement will include many features in common with formal legal deposit agreements, whether for print or digital material.

2.8.7 Mixed deposit

In some countries, deposit arrangements may be a mixture of legal and voluntary deposit. Such hybrid arrangements may be a pragmatic response by national bibliographic agencies to the restricted scope of legal deposit. Selective voluntary deposit schemes may also arise from long-standing agreements between the national bibliographic agency and a specific sector, such as the recording industry.

Voluntary schemes may be temporary, as when governments and national bibliographic agencies trial the extension of deposit to new categories of material through voluntary arrangements. The risk is that such temporary schemes may not ultimately lead to legal deposit. National bibliographic agencies should therefore monitor the relative effectiveness of such schemes compared to formal measures for other classes of material in order to support the case for extension of legal deposit.

2.9 Examples

2.9.1 Italy

The legal deposit system in Italy has a dual level (national and regional, i.e. local). According to the Law of April 15, 2004, n. 106 and to the Presidential Decree of May 3, 2006, n. 252, all publishers are required to deposit one copy of their publications at the National Central Library of Florence and one copy at the National Library of Rome for the creation of a National Archive of publishing production, plus additional copies to libraries in the regional territory for the creation of a Regional (i.e. local) Archive of publishing production.

2.9.2 Japan

Publishers in Japan are obligated to send a copy of all new publications to the [National Diet Library \(NDL\)](#), in accordance with the [National Diet Library Law](#) (Law No.5, February 9, 1948).

Government agencies must send a prescribed number of copies of their publications immediately to the NDL. When a work is published privately, the publisher must send a complete copy of its best edition to the NDL within 30 days.

The NDL maintains a Branch Library System to provide the executive and judicial branches of government with library services. These branch libraries are located at various government agencies as well as at the Supreme Court. Branch libraries also function as part of the legal deposit system in that they serve as collection points for publications issued by government agencies.

Private publications are submitted to the legal deposit system almost entirely through major wholesalers.

2.9.3 Lithuania

The revised *Act of the Government of the Republic of Lithuania* of 11 November 2006, which replaced the *Act of the Government of Lithuania* of 22 November 1996, covers books, periodicals, printed music, micro-forms, audio-visual, cartographic, pictorial and electronic publications as well as materials published in Braille.

Lithuania was one of the first European countries to start archiving (in 2002) its domain and create bibliographic control of web documents.

2.9.4 Norway

The Norwegian Act of Legal Deposit of Generally Available Documents of 9 June 1989 came into effect on 1 July 1990. It was one of the first legal deposit acts to include digital publications, both offline and online. The act covers paper documents (e.g. books, periodicals, postcards, and photographs), sound recordings, films, videos, recordings of broadcasts and digital publications. Harvesting of the whole Norwegian domain has been carried out on a regular basis since 2005. A more selective harvesting approach is also being used; e.g. event-based harvesting and downloading of newspapers.

2.9.5 Switzerland

There is no federal law on legal deposit in Switzerland. However, the [Swiss National Library \(SNL\)](#) has set up voluntary agreements with the two national publishers associations, [Schweizerischer Buchhändler- und Verleger-Verband \(SBVV\)](#) and the [Association Suisse des Diffuseurs, Éditeurs et Libraires \(ASDEL\)](#), formerly SLESR, to build up its collections.

According to these agreements, publishers deposit a copy of each new publication with the SNL which lists them in *The Swiss Book*, the national bibliography, and in Helveticat, the online catalogue. In return, the SNL ensures the conservation of these publications and establishes annual statistics on Swiss literary output. The SNL also buys around 11,000 titles annually, mainly monographs published abroad and serials.

In the absence of formal legal deposit, more staff time is required to track and request publications. It is estimated that for printed monographs coverage is 90%, although it can take up to two years to achieve this via claims requests since not all publishers (especially the smaller ones) automatically deposit items. The deposit of online digital resources is under examination.

2.9.6 United Kingdom and Ireland

The United Kingdom and Ireland are considered together because, although each country has its own legislative framework, the legal deposit obligations imposed on publishers operate across national boundaries.

In the United Kingdom, the [Legal Deposit Libraries Act 2003](#) and, in Ireland, the [Copyright and Related Rights Act, 2000](#) make it obligatory for publishers and distributors in the United Kingdom and Ireland to deposit their publications.

Publishers and distributors in the United Kingdom and in Ireland have a legal obligation to deposit published material in the six legal deposit libraries which collectively maintain the national published archive of the British Isles. These are:

- The British Library
- The Bodleian Library, University of Oxford
- Cambridge University Library

- The National Library of Scotland, Edinburgh
- The Library of Trinity College, Dublin
- The National Library of Wales, Aberystwyth.

Publishers are obliged to send one copy of each of their publications to the British Library within one month of publication. The other five libraries have the right to claim items. In practice, many publishers deposit their publications with all six libraries without waiting for a claim to be made. In the UK, a court order may be obtained to enforce compliance and, in the last resort, to impose a financial penalty. In Ireland, publishers may be required to deposit up to 13 copies and failure to comply with the legal deposit requirements can result in a substantial fine.

All printed publications come within the scope of legal deposit. Under the [Legal Deposit Libraries \(Non-Print Works\) Regulations 2013](#) electronic publications also came into scope. In Ireland, the [Copyright and Related Rights Act, 2000](#) has extended legal deposit to electronic formats.

In the absence of legal deposit legislation covering audio-visual materials, the British Library Sound Archive has a long-standing agreement with the [British Phonographic Industry Ltd \(BPI\)](#), through which its members agree to deposit up to two copies of all UK recordings free of charge. In practice, intake of BPI members' and other record companies' output is dependent on resources available to monitor output and request deposit.

2.10 Currency

The [IFLA/UNESCO Guidelines for Legal Deposit Legislation](#) suggest that deposit should take place as soon as possible after publication. In addition, the ICNBS recommendation 7 states that:

The national bibliography should list material as soon as possible after publication. Provision should be made for its effective distribution and it should appear in a regularly updated form to meet the needs of the users, thereby enabling them to acquire the material listed there without delay.

This is a crucial point in terms of the currency of the national bibliography. The listing of material as soon as possible after publication is an essential requirement for a current awareness service. While currency is dependent on the timely deposit of items, the NBA also has an obligation to process these publications without delay.

NBAs must take care to monitor the currency of the national bibliography and take action in response to declining currency. The appropriate action will depend on the reason for the delay. Workflows should continually be improved to ensure that items move through the process as efficiently as possible.

Currency is also of value to publishers wishing to promote their products. Publishers can be encouraged to deposit "in bulk" to improve efficiency and can be made aware of the benefits of the timely appearance of their titles in the national bibliography.

Cataloguing in publication (CIP) arrangements, by which publishers provide bibliographic information in advance of publication, are a means of improving the currency of information as well as enhancing the value of the national bibliography for collection development.

2.10.1 Cataloguing in publication (CIP) overview

CIP programmes assist publishers and libraries.

- For publishers the programme acts as a bridge to the library book-buying market.
- For libraries it is an alerting service enabling selectors to identify books of interest to the user community.

CIP programmes commonly work in the following way:

1. The NBA determines the data elements to be supplied for the programme and makes a printed information sheet or web form available for completion by publishers together with current contact information for queries etc.
2. Several months in advance of publication, publishers provide detailed information about forthcoming publications to the NBA.
3. This information is used to create a preliminary or “CIP” record.
4. The preliminary record is published in the national bibliography.
5. A copy of the CIP record may be provided to the publisher who prints it on the book in order to make it easier for libraries to catalogue the book. In some cases, the record is not printed, but the publisher prints a declaration that a CIP record is available from the national bibliographic agency.
6. When the resource is received by the bibliographic agency, the preliminary record is updated to reflect the item in hand
7. The final “upgraded CIP” record is published in the national bibliography.

2.10.2 Establishing a CIP programme

There is no single model for CIP programmes; each national bibliographic agency is different and the programmes evolve to satisfy local requirements. IFLA conducted a survey of CIP programmes in 2003/4 ([Survey of CIP programs report, \[2005\]](#)).

Issues to consider when establishing a CIP programme:

- The active participation of publishers is critical to the success of a CIP programme. The NBA must therefore advocate the benefits of CIP to publishers and publisher organisations.
- CIP programmes are voluntary and should be free of charge to participating publishers.
- Participation in a CIP programme must not disrupt the work of publishers.

The NBA must ensure that the CIP programme is adequately resourced and make suitable business cases for development as required.

2.11 Examples

2.11.1 Canada

In Canada, responsibility for coordination of the programme resides with Library and Archives Canada, but the programme is operated in partnership with Bibliothèque et Archives nationales du Québec which provides services to French-language publishers based in Québec.

2.11.2 United Kingdom

The British Library has found it more cost effective to contract out operation of the CIP programme to a commercial bibliographic agency. The British Library pays the contractor for delivery of a number of CIP records annually and sets criteria for content and quality.

2.11.3 United States of America

In the United States of America, the service is directly controlled and operated by the [Library of Congress](#).

2.12 Promotion of national bibliographic services

Promotion of national bibliographies should be targeted at publishers and the book trade community, rights management organisations, researchers, media and the general public that could benefit from comprehensive and timely information on national published output. Until recently, however, NBAs have not prioritised the promotion of national bibliographies to the wider community due to the perceived specialised nature of the market. Potential users of national bibliographies extend beyond the traditional library environment and are addressed later in this document (see [Chapter 3](#)).

Increasingly, promotion of national bibliographies is achieved via the web. It is important to provide a clear and direct link to the national bibliography from the NBA's website home page. Some NBAs are using techniques such as RSS feeds to promote the national bibliography to the public via the dissemination of newly-published works tailored to their specific interest profiles. Similarly, a "new books" webpage or website can call attention to recently released publications. It is also important that the national bibliography is harvested by major search engines such as Google and Yahoo, while ensuring that the provenance of the records is clearly indicated. Since national bibliographies are often publicly funded, there has been a growing call for them to be seen as national data assets to be made freely available under open licensing terms. The promotion of national bibliographies made available under such terms brings its own challenges in terms of resourcing and reaching potential new user groups such as researchers or the developer community who are unfamiliar with library standards.

2.13 Intellectual property rights and rights issues

2.13.1 Copyright

Copyright law protects:

- The right of creators to be recognised and rewarded for their work.
- The public interest in freedom of access to information and ideas.

The copyright situation in every country is different. However, the position in respect to print materials is established and well understood. The situation in respect to electronic resources is still being worked out due to the rapidly evolving nature of the technologies involved and is not yet clear.

National bibliographic agencies must recognise that creators and publishers have a legitimate right to protect their creations. National bibliographic agencies should work with publishers and creators to build confidence that access to electronic resources deposited with the agency will be secure.

2.13.2 Digital copyright

Access to electronic resources is often restricted by contract and by technical protection measures. Contracts issued with digital works may impose conditions on access or constrain access in ways that go beyond the restrictions applied to printed resources.

These restrictions on electronic media not only inhibit access, but may also constrain other functions carried out by national bibliographic agencies. For example, security devices embedded in electronic resources may prevent the resource from being copied for preservation or prevent access to the resource after a specified period of time has elapsed.

Confidence that access to electronic resources deposited will be secure can be built through a number of measures under the control of the NBA, e.g.:

- Restrictions may be imposed on the location from which resources may be accessed, e.g. computers physically located inside the national library.
- Restrictions may be imposed on the number of simultaneous users who may access a legal deposit resource.
- Restrictions may be imposed on who can access a legal deposit resource, e.g. a registered user of the NBA.

However, NBAs must also protect the interests of their own stakeholders. There is a public good inherent in the free access to information. NBAs should work with government to ensure that these protections are not eroded.

IFLA's Advisory Committee on Copyright and other Legal Matters (CLM) has issued a statement addressing these issues in the context of the Access to Knowledge (A2K) treaties and the [World Intellectual Property Organization \(WIPO\) Development Agenda](#). IFLA explicitly calls for a partnership between WIPO and libraries to enable developing countries to compete in the knowledge economy. It also urges WIPO to take control of the public domain and to ensure that resources in the public domain are not rendered inaccessible through the use of Technological Protection Measures (TPMs).

3 Purpose and value

3.1 The mission of the national bibliography

3.1.1 Establishing the need for a national bibliography

Due to internationalisation, digitisation and media convergence, new and more sources of information are becoming available via the web. NBAs need to ensure that they offer something that other services cannot provide, for example by being published as open data and having the highest standard of reliability, and furthermore that the value of the national bibliography is always obvious, well-advertised, and known.

3.1.2 Basic objectives

Three main objectives have been traditionally assigned to national bibliographic services. The first is to assist cost-effective cataloguing in libraries. The second is to facilitate libraries in their selection and acquisition activities. The third is to further information searching and retrieval for document supply. These objectives are still valid. What is changing today is the environment in which such objectives are implemented.

Vitiello, G. (1999). *Legal deposit and national bibliographic services: developments in the framework of the cooperative perspective and the convergence phenomenon.*

A complete and timely national bibliography is an important information resource both in a national context as well as in an international context regarding:

- Selection and acquisition in libraries and similar institutions
- Cataloguing (both directly for copy cataloguing or linking and indirectly for cataloguing support)
- Verification of authorship and publication history.

Additionally, the national bibliography is an important source in documenting the national output for posterity.

As a data set, the national bibliography should support:

- Sophisticated searching and many access points
- Links to local catalogues or full-text to enable access to publications sought
- Data analysis for statistics, visualisations, for research and making the data accessible for services outside the library context.

3.1.3 Selection and acquisition

The national bibliography is a tool for selection and acquisition of materials and, consequently, a promotional tool for the publishing industry. To fulfil this function (Lewis, 1991):

The data has to be available immediately after publication, preferably even before publication

- For selection, subject and target audience data are essential, as well as price, while for acquisitions the data on publisher and distributor, conditions of sale, and, of course, standard identifiers such as [ISSN](#), [ISBN](#), etc. However, it is becoming more common to use other information sources for obtaining data on conditions of sale.

- The format of bibliographic records has to enable simple import of data into local information systems or catalogues.

3.1.4 Cataloguing

As a cataloguers' tool, the requirements are:

- High quality and completeness of records (including subject analysis and classification)
- Full coverage
- Timely access to new records
- Compliance with national and international standards
- Continuity between retrospective and current bibliographies
- Simple copying of records into local catalogues
- ...or depending on data model: the possibility of linking to the entities described in the national bibliography so as to use the data directly on the fly in the local catalogue.

3.1.5 Verification

National bibliographies may also be of use to audiences beyond libraries, the publishing industry or the book trade to:

- Give the statistical account of a country's publishing output
- Provide evidence of the impact of government policies in relation to education, language, economic programmes, etc.
- Reveal the extent of a country's self-sufficiency in producing the publications it requires
- Verify what has been published by whom in a world where there is an increasing uncertainty about the origins of information.

3.2 Definitions

What is a national bibliography?

A current national bibliography is a mirror that reflects the culture of a country. By looking at the current national bibliography, one is able to learn about the uniqueness of a country. The emphasis on agriculture and technology, the make-up of its society through its various language publications, particular customs and ceremonies important in the life of the nation, the importance of education, literature and science, prominent literary authors of the time and political, social and religious trends within a country are all discernible. A current national bibliography should reflect the interests and unique characteristics of a country much as a mirror reflects the uniqueness of an individual.

Bell, B. L. (1998). *An annotated guide to current national bibliographies* (2nd completely rev. ed.). München: K.G. Saur

More than 50 years ago, the definition was:

[...] the ideal (current national) bibliography is conceived as a complete listing of all books, documents, pamphlets, serials and other printed matter published within the bounds of a single country and within the time limits of the previous year or less.

Conover, H. F. (1955). *Current national bibliographies*. Washington: U.S. Government Printing Office.

Bell's definition is more general: national bibliography in the modern sense is defined as an accumulation of the authoritative and comprehensive records of the national output (i.e. products of the national publishing industry (commercial and non-commercial sector, including government and official publications)) of a country, published regularly, and with the least possible delay. It is produced in accordance with international standards by the national bibliographic agency. Publication details and authorship are investigated and verified in detail. However, advances in technology, the growth of the web and a multitude of electronic information resources and consequent changes in publishing have inevitably changed the scope of national bibliographies. Such developments, combined with advances in search-engine technology and the advent of new approaches such as linked open data require a reappraisal of national bibliographic services.

3.3 Relationship to legal deposit

Legal deposit is an obligation by law or other regulations to compel printers, publishers and distributors to deliver one or more free copies of their publications to the national library or other "legal deposit libraries". In some countries, where publishers desire early registration of their publications, there may also be voluntary agreements between publishers and national bibliographic agencies.

In order to enable national bibliographic control to function efficiently and in order to make the product truly trustworthy, it is important to link registration of items for a country's national bibliography with that country's legal or voluntary deposit function.

Internationalisation, digitisation, media convergence and the widening of legal deposit directives make scoping and selection more complex. At a national level, each country needs to define what the national publishing output is considered to be.

3.4 National bibliographic agencies and the role of national bibliographies

In many countries, responsibility for creation of the national bibliography resides with the national library. However, the national bibliography is not synonymous with the national library's catalogue since the scope of each differs.

- In some cases, the catalogue is a record of the national library's collection. Inevitably, some collection material will be excluded from the national bibliography because it is published outside the country or has no direct connection with national literature.
- The national bibliography is a record of the national published archive and thus may incorporate material which is not in the national library's collection. This is often the case when responsibility for collecting and cataloguing the national published archive is distributed among different agencies. The national bibliography may also include records for forthcoming publications, notified to the national bibliographic agency through a Cataloguing in publication (CIP) programme.

Each national bibliographic agency will follow the production model that best meets its needs. The national bibliography may be a product derived from the national library's cataloguing of its own collection; alternatively, records created by the national bibliographic agency may be incorporated into the national library catalogue.

Ideally, both the national bibliography and the national library catalogue will be products derived from a common pool of data. Irrespective of which production model is followed, the overlap between the national library catalogue and national bibliography should be exploited to maximise efficiency via the reuse of bibliographic metadata with minimal manual amendment.

3.5 Production efficiencies

Efficient reuse of metadata is dependent on standardisation and consistency. The same standards should be followed for both the national bibliography and the catalogue – and ideally other library catalogues as well – and workflows should be integrated as much as possible. Pre-existing metadata is reused at each stage in the workflow (selection, acquisitions, accessioning and description). Metadata that is added for any stage in the workflow should be fit for purpose; that is, it should be accurate and conform with standards and policies appropriate to that type of data. Standardised workflows are easier to automate. Exception handling is resource intensive and should be minimised through a process of continuous improvement.

In practice, assignment of product or service specific metadata is sometimes necessary.

Examples include codes to control the publication of a record in a specific issue of the national bibliography or to identify the section in which each record will appear. Metadata may also provide information for management of processes or collections. Give careful consideration to the most efficient and cost-effective means of assigning such metadata. Situations in which metadata required for one purpose or institution are in conflict with metadata assigned for another are inefficient. Conflicts may arise between a general standard and a local practice. In the long term, adherence to standards will prove more efficient than maintenance of local practice. The challenge of rationalising metadata and workflows should not be underestimated. It can take significant amounts of time and energy to change entrenched process and policies. However, failure to address these issues can be incredibly wasteful. No matter how well intentioned, duplicated processes put a strain on resources and are unlikely to be sustainable in the long run. Subject analysis is a particularly resource-intensive aspect of the cataloguing process and reuse, or at least retention, of any subject metadata assigned at any point in the process should be favoured. Keep in mind that if certain resources are being subject indexed twice, losing currency in the process, other resources may not be being indexed at all. There can be a tension between the expectation that the national bibliography will provide standard subject classification or indexing and a local classification practice adopted to manage the national library collection. In such a case, the standard metadata should be retained, and the local system should be added, preferably by an automated transformation or cross-walk.

It is recommended that the national bibliography and the catalogue of the national bibliographic agency should be derived from a single logical data set. National bibliographic agencies establishing new national bibliographies are strongly encouraged to conceptualise the national bibliography and the national bibliographic agency catalogue as separate products, or views, derived from a comprehensive set of bibliographic data.

3.6 International recommendations

The national bibliography defined as a bibliographic system or a special national bibliography is relatively new. The phrase “national bibliography” appears in the literature about the middle of the 19th century primarily as a description of the national lists of books. It was not until the first half of the 20th century that a broader definition was recognised. (Madsen, 2000).

An essential decision to extend the definition to all kinds of documents was made by the international conferences arranged by UNESCO in 1950, by UNESCO in cooperation with IFLA in 1977 and by IFLA in November 1998. The results of the conferences are a series of recommendations that have greatly influenced the structure of national bibliographic services throughout the world.

3.6.1 UNESCO conference on the improvement of bibliographical services (1950) <http://www.ifla.org/best-practice-for-national-bibliographic-agencies-in-a-digital-age/node/8302>

The 1950 recommendations became central to the development of national bibliographies by defining that the national bibliography is not solely a list of books but a system of bibliographies that formed the core of the “national bibliographic service”.

Key recommendations:

- The national bibliography should not be a single listing, but a coherent system of bibliographies that act together to document and register publications in a particular country.
- National bibliographies should include lists of books and pamphlets published and sold in each country together with audio-visual materials.
- Only important articles should be registered in periodical indexes.
- Directories of institutions and firms selling documents in the country in question should be established.
- Instructions concerning the publication of printed national bibliographies.

In addition to detailed recommendations of what kinds of documents should be registered, the 1950 recommendations include short directions on:

- Potential demands caused by the levels of cataloguing required
- Publishing the national bibliography
- Legal deposit and the national bibliography
- Holdings of the publications at the national library.

3.6.2 UNESCO/IFLA international congress on national bibliographies (1977)

The 1977 Conference resulted in the publication of *Guidelines for the National Bibliographic Agency and the National Bibliography* (International Federation of Library Associations, IFLA International Office for UBC & UNESCO, 1979).

Between 1950 and 1977, focus shifted from coverage to the registration and formatting of the bibliographic data. This may have occurred because coverage was increasingly considered obvious while the growing challenge was how to migrate to online cataloguing with improved sharing of bibliographic data. Additionally, in 1950 all the different publication types that should be registered were listed, however, the 1977 recommendations note only the minimum a national bibliography should register.

Key recommendations:

- The national bibliography is defined as: “the cumulation of the authoritative and comprehensive records of the national imprint of a country, published in a printed form (and/or produced in other physical form, such as catalogue cards, machine-readable tapes) regularly, and with least possible delay.”
- The “national imprint” is defined as “the products of the national publishing industry”, i.e. it is the home country of the publisher that determines where a publication should be registered.
- The national bibliography must secure the basic authoritative registration of a country’s imprint including authority control of personal names and corporations.
- “The (national bibliographic) agency may [...] determine that the national bibliography should include not only the records of the national imprint but also certain other categories of material. These generally relate specifically to the country and can be

considered part of the national collection, that is, all publications relating to any aspect of the country's cultural, historical, geographical and linguistic environment".

- As a minimum, records for monographs and first issues and title changes of serials, including official publications, of the national imprint; and other categories should be included.
- Records should be created as rapidly as possible to meet the requirements of the national library community and the resources of the national bibliographic agency.
- Registration should be in accordance with the international cataloguing and classification rules and there should be compatibility between the bibliographic formats used both nationally and internationally.
- A country's national bibliography is an essential component of the wider activity of universal bibliographic control (UBC) and it is important to be able to exchange and reuse bibliographic data.
- Selection criteria for a national bibliography.
- The level of cataloguing required for a national bibliography.
- Instructions concerning the publication of printed national bibliographies.
- The optional electronic publication of the national bibliography, and the potential inclusion of national bibliographic data in an international database.

3.6.3 International Conference on National Bibliographic Services (ICNBS) (1998)

Held in Copenhagen on 25-27 November 1998, under the auspices of IFLA, the Danish Royal Library, the Royal School of Library and Information Science and the Danish Library Centre, the [International Conference on National Bibliographic Services](#) had the aim of reviewing and updating the recommendations of the 1977 International Congress on National Bibliographies in the light of subsequent developments. While previous recommendations had concentrated upon printed national bibliographies, [ICNBS recommendations](#) (revised in 2002) acknowledged the dynamic progress of information technology and the new possibilities presented together with the new demands on national filing and registration. The recommendations also promote the use of national bibliographic systems in countries that are unable to utilise information technology. However, the unique feature of the 1998 recommendations is the emphasis placed on the role and responsibility of national bibliographic agencies and the importance of legal deposit. In contrast to previous recommendations listing different document types, the 1998 recommendations refer to "current national output", i.e. all documents published in a country regardless of carrier format, e.g. printed, audio-visual or electronic. A consequence of this could be that all new document types (e.g. online publications) should be treated on equal terms with traditional document types.

Key recommendations:

- The key role and responsibility of the national bibliographic agencies and the importance of legal deposit.
- National libraries and national bibliographic agencies may work co-operatively with other agencies, but overall responsibility for co-ordination and implementation of standards should rest with the national bibliographic agency.
- The vital importance of legal deposit in ensuring that the cultural and intellectual heritage and linguistic diversity of the nation is preserved and made accessible for current and future users.
- Contemporary legal deposit regulations underpinning national bibliographic services are a matter of urgency, i.e.:

- States should, as a matter of urgency, examine existing deposit legislation and consider its provisions in relation to present and future requirements; and, where necessary, existing legislation should be revised.
- States currently without legal deposit legislation are urged to introduce it.
- National bibliographies should cover current national output, and where practicable also provide retrospective coverage.
- When necessary, selection criteria should be defined and published by the national bibliographic agency.
- The national bibliography should include records for materials in all languages and/or scripts in which publications are produced within a state; and wherever possible such records should include the languages and/or scripts in which the publications originally appeared.

3.6.4 IFLA working group on Guidelines for national bibliographies in the digital age (2010)

When examining the history of recommendations relating to the creation and management of national bibliographic services, the working group identified a number of ways in which the concept of the national bibliography had evolved since 1950. The Working Group also identified a number of persistent themes and shared characteristics that had remained throughout the period together with a series of new factors arising from the development of digital publishing. The challenge posed by electronic resources is one of the issues that also led to IFLA's development of [*Functional Requirements for Bibliographic Records \(FRBR\)*](#), then a new conceptual model of the bibliographic universe. In addition to its analysis, the working group made the following recommendations:

- The responsibility to develop, maintain and promote rules, standards, selection criteria should be assigned to a national bibliographic agency.
- The national bibliography should include all types of publications but not necessarily all publications. Exhaustiveness need not be an absolute goal.
- Pragmatic formal selection criteria should be defined and published.
- The national bibliographic agency should decide on different levels of cataloguing for different kinds of publications, based on the significance of the resource.
- National bibliographic agencies are encouraged to exploit all available technology to support the creation and maintenance of the national bibliography.
- National bibliographic agencies should seek opportunities to collaborate with other stakeholders to support and improve the national bibliography.
- National bibliographic agencies should analyse and periodically review the use (including potential use) of the national bibliography.

3.6.4.1 *The evolving concept of a national bibliography*

In 1950, the emphasis was on a detailed description of what kinds of documents should be registered in the national bibliography, but there was little direction on:

- Levels of cataloguing
- Publishing the national bibliography
- Legal deposit
- Relationship to holdings of the publications at the relevant national library.

Since 1977:

- It has been assumed that the national bibliography is a complete registration of all publications in a country regardless of format and at the same level of cataloguing. This was often interpreted to mean the highest existing level.

- Agency managers with budgetary responsibilities consequently view cataloguing as very expensive with some managers prematurely concluding there is no need for a national bibliography to cover web documents at all.

The 1998 recommendations specified general principles, but:

- Did not offer guidance on how the “current national output” should be defined.
- Omitted instructions on the inclusion of electronic information resources in the national bibliography.

3.6.4.2 *New factors*

Web publishing, new formats and media have changed the scope of the “national published output” by:

- Challenging our definition of *published*
- Lowering the barriers to publication
- Offering even individual publishers a global reach
- Raising user expectations on instant access to content rather than just a description of it.

Traditional cataloguing practices, predicated on book-in-hand analysis of resources by professional staff, are not scalable to the new era of web and electronic publishing.

The proliferation of digital media and formats raise new challenges for the organisation and presentation of information and provision of access.

Electronic resources pose new challenges for resource description and access since they may:

- Be related to existing printed resources, but differ in scope or content
- Be available in multiple formats
- Contain multiple components
- Be constantly updated.

Since IFLA’s [*Functional Requirements for Bibliographic Records \(FRBR\)*](#) was derived from a detailed analysis of resource discovery user tasks it identified the basic metadata structures considered to be required to support resource discovery. In the final section of the FRBR report, chapter 7 “Basic requirements for National Bibliographic Records”, the user tasks and the attributes and relationships were brought together to identify the elements required to meet a basic level of functionality. Section 7.3 presented the minimum data requirements that constituted the recommended *basic level national bibliographic record* (p.112-116). The FRBR model and the cataloguing guidelines *Resource Description and Access (RDA)* based on it moved the focus from recording details about the manifestation in hand to recording entities and relating those entities to one another in order to describe the material. This was also relevant in the national bibliography.

The confusing multiplicity of resources to be conveyed to users in a meaningful way creates new challenges for those developing online bibliographic services or supporting resource discovery using national bibliographic records.

3.6.5 Warsaw conference (2012)

In August 2012, the IFLA Bibliography Section, together with the IFLA Cataloguing Section held a conference on *Bibliography in a Digital Age* at the National Library of Poland in Warsaw. The event was a satellite meeting to the IFLA 2012 World Library and Information Congress (WLIC). Its purpose was to share experiences, techniques and challenges in order to identify developing themes and best practice.

Emerging themes:

- A need for pragmatic selection policies.
- Open services to wider user groups.
- Acquisition and application of new skills.
- Linking and use of persistent identifiers.

- Definition of “published” digital material.
- Targeted metadata transformation and crosswalks.
- Requirement for multiple forms of metadata.

National bibliographic agencies:

- Operate in a global market. For example, by exchanging authority data and contributing to a world bibliography.
- Create and supply metadata for a wider range of resources than ever before, considering new challenges with born digital resources.

Pragmatism and selection:

No universal solution exists and national variation exists between:

- Coverage of print, digital and multimedia.
- Breadth and depth of descriptions applied.
- Definition and treatment of materials.

But there’s an agreement that:

- We cannot be exhaustive but we can be representative.
- We should balance effort in creation of quality description and access points.
- “Minimal” must still be accurate.
- We must be selective in harvesting and enhancement techniques.
- Advance (e.g. CIP) data is still valued.

Users

New user types require greater flexibility in:

- Support skills (e.g. technology, legal, library).
- Access options including connection to content.
- Output formats and standards.
- Personalisation of data and services.

But all value consistency, authority and persistence of services offered.

Open

“Open” is becoming the norm via:

- Open licensing models
- Open access routes
- Open standards.

Charging is a “MARC” or “premium service” issue concerning professional and/or commercial usage.

Being able to accommodate increasing data re-use requires proactive licensing that is compatible with open access.

Growth areas

- Automated data creation – and enhancement.
- Web harvesting – selection/domain/event.
- Large scale processing of e-publications – via new workflows.
- Growth in the use of ontologies and controlled vocabularies.
- Semantic approaches – from MARC tags to RDF triples.

- Development and maintenance of persistent links and identifiers.
- Linking – to and from resources.

3.6.6 IFLA professional statement on Universal Bibliographic Control (2012)

In 2011, when the IFLA-CDNL Alliance for Digital Strategies (ICADS), the successor to the IFLA-CDNL Alliance for Bibliographic Standards (ICABS), was discontinued, the Bibliography Section took on the responsibility for promoting UBC. Approved in December 2012, the [*IFLA Professional Statement on Universal Bibliographic Control*](#) that the Section developed reaffirmed the importance and continued relevance of UBC.

The first two principles in the *Statement* are directed to NBAs and speak directly to national bibliography activities in the area of bibliographic control:

A National bibliographic agency (NBA) has the responsibility for providing the authoritative bibliographic data for publications of its own country and for making that data available to other NBAs, libraries, and other communities (for instance archives and museums) through appropriate and timely services with the goal of increasing open access to the bibliographic data.

NBAs, as a part of the creation of authoritative bibliographic data, also have the responsibility for documenting authorized access points for persons, families, corporate bodies, names of places, and authoritative citations for works related to their own country and for making that authority data available to other NBAs, libraries, and other communities (for instance archives and museums).

The other three principles are intended to guide IFLA's actions relating to bibliographic standards. IFLA's role includes:

[...] maintaining and promoting the Statement of International Cataloguing Principles (ICP) [...] creating, maintaining and promoting bibliographic standards and guidelines to facilitate this sharing of bibliographic and authority data [...] work[ing] collaboratively with other international organizations (e.g., ISO, ICA, ICOM, etc.) in the creation and maintenance of other standards [...].

3.7 Users and stakeholders

While there is good evidence and understanding of the use of national bibliographies in libraries, there is a lack of substantial data on the use made by other users. In some countries (e.g. Czech Republic and Norway) national libraries have investigated who the users of national libraries are together with the contexts in which they work. However, further studies by all national bibliographic agencies that focus on the uses made of national bibliographies are encouraged. In addition to current users we also need to understand future or potential user requirements, not only to justify the continued production of the national bibliography, but also to develop and implement the required services in a timely manner.

An interesting view of users and uses was proposed by the [*Library of Congress Working Group on the Future of Bibliographic Control*](#). According to the [*report*](#) of the March 8, 2007 meeting:

There are two main information user and use environments for bibliographic data: a consumer environment and a management environment. The consumer environment relates to the end-user of the bibliographic data, the information consumer, and services that are designed to assist the end-user in finding relevant information, from search engines to specialised catalogue

interfaces. The management environment pertains to resource collection management. Although these two environments represent different perspectives of bibliographic data, they are interrelated, for example, in that data recorded primarily for one environment may also be of use to the other. The creation of authoritative bibliographic data still is necessary to support both environments; however, current bibliographic data do not fully meet the needs of either environment.

The Bibliography Section Working Group [analysed](#) current information requests and typical uses of national bibliographies recorded by European national bibliographic agencies. The situation varies from country to country, but there are some common traits among certain groups of users. Such groups work in different contexts and therefore have differing information needs. These needs must be taken into account when defining access points for search and essential metadata elements for display or export of national bibliographic data.

User groups for national bibliographies include:

- Book trade
- End users
- Libraries
- National agencies
- Publishers
- Rights management agencies
- Software/harvesters

3.7.1 Book trade

The requirements of booksellers and other members of national book trade supply chains can be similar to those of collection development, acquisition or reference librarians in using national bibliographies to identify:

- Potential new works to order and add to their inventory (e.g. via advance publication data)
- Publishers and distributors capable of supplying the works
- Works of possible interest in response to individual customer queries
- Publication status including old or out-of-print publications for which customers might be referred to libraries
- Metadata elements to enrich their own bibliographic data.

Information requirements from the national bibliography

Book trade members may require the following from the national bibliography to perform their functions.

Descriptive metadata requirements (for offline files or printed national bibliographies)

Book trade requirements for display of results or citations are similar to those of collection development librarians wishing to order material from publishers, i.e.:

- Complete records
- Address and contact information for publisher
- Price
- Availability
- Rights.

In order to ensure the currency of the information provided, external links, e.g. to books-in-print or publisher sites, may be preferred.

Search requirements (for online national bibliographies)

Search requirements are similar to those of cataloguers and reference librarians (e.g. known item and subject) and therefore require the same typical access points, e.g.:

- Title
- Author
- Standard identifiers (e.g. [ISBN](#), [ISSN](#))
- Publication date
- Subject
- Series.

3.7.2 End users

End users have not always been considered a priority audience. However, the IFLA Bibliography Section affirms the importance of the national bibliography as a key cultural heritage resource and recommends that measures are taken to ensure public access to the information.

This category includes a highly varied range of users including:

- Library patrons
- Online users wishing to find and identify publications
- Every person, group or corporate body looking for information related to the published output.

Numerous potential usage examples exist, e.g.:

- Printers identifying publishers to offer cooperation
- Journalists to identify language/genre/origin patterns in publications
- Organisers of book fairs
- Identification of translators from/to specific language
- Identification of illustrators.

Information requirements from the national bibliography:

End users primarily need to obtain information on:

- Authors and their publications
- Subjects.

In order to:

- Identify works for further study or acquisition
- Obtain access to publications
- Produce lists of references
- Research the history of publishing.

Expectations also include:

- Access to electronic resources (taking into account rights, authentication and authorisation, etc.)
- Location information for physical publications
- Display or export of bibliographic records in appropriate formats.

Descriptive metadata requirements (for offline files or printed national bibliographies)

End user requirements for display of results or citations are similar to those of reference librarians wishing to identify specific publications, i.e. data displayed should include:

- Complete records
- All elements needed to identify, select and enable to obtain access to publications ([IFLA Statement of International Cataloguing Principles \(ICP\)](#), 2016).

Search requirements (for online national bibliographies)

Search requirements are similar to those of reference librarians or book trade users and therefore require similar access points, e.g.:

- Creator name
- Title words
- Language/country of publication
- Publisher
- Publication year
- Subject headings or keywords
- Publication type/genre/format
- Standard identifiers (e.g. [ISBN](#), [ISSN](#)).

3.7.3 Libraries

Key library functions that use metadata from national bibliographies include:

- Acquisitions
- Cataloguing
- Collection development.

In addition, the following library groups and activities may also use national bibliographic metadata:

- Reference librarians – acting on behalf of end users.
- Management of legal deposit activities – due to the close relationship between the national bibliographies and legal or voluntary deposit material.
- Preservation librarians – can use national bibliographic metadata to determine new trends in publishing and plan preservation procedures accordingly.
- Digitisation management – national bibliographies can provide an overview of older materials that might be candidates for digitisation.

3.7.3.1 *Acquisitions*

Information requirements from the national bibliography

Acquisitions librarians require national bibliographies to:

- Order publications
- Identify publishers and distributors
- Determine publication status.

Descriptive metadata requirements (for offline files or printed national bibliographies)

Requirements for display of results are similar to collection development librarians, i.e. complete bibliographic records with a reference to publisher data to enable accurate ordering of publications. In order to ensure currency, external information, e.g. books-in-print or publisher sites, are preferred.

Publication information should include:

- Address and contact information for publisher
- Availability (forthcoming or published)
- Rights.

Search requirements (for online national bibliographies)

Requirements for searching are similar to cataloguers, i.e. known items, and therefore require the same typical access points:

- Title
- Creator

- Standard identifiers
- Publication date.

3.7.3.2 Cataloguing

Libraries require national bibliographies for copy cataloguing and cataloguing support in general (e.g. to identify precedents for similar material being catalogued). Cataloguers therefore need complete bibliographic records to be supplied in a standard format (e.g. UNIMARC or MARC 21).

Information requirements from the national bibliography

The most common type of catalogue query is known-item *searching* e.g. for a record relating to the specific publication being processed. To verify authors' names, cataloguers may also search directly in the name authority file being used by their institution.

Search requirements (for online national bibliographies)

The typical access points required by cataloguers include:

- Title
- Creator
- Standard identifiers
- Publication date
- Corporate body name (*any variant*)
- Personal name (*any variant*).

3.7.3.3 Collection development

Librarians in charge of collection development require national bibliographies (both local and from other countries) to:

- Analyse available publications
- Select according to collection development criteria
- Become aware of future publications (e.g. via CIP records).

Information requirements from the national bibliography

To be useful for collection development, a national bibliography should offer subject access together with analysis of different aspects of publications.

Descriptive metadata requirements (for offline files or printed national bibliographies)

Complete bibliographic records should be presented as results. Reference to further publisher data is also necessary in order to obtain:

- Price
- Availability (publication status)
- Terms and conditions (rights, technical requirements).

Search requirements (for online national bibliographies)

Typical access points required for collection development activities include:

- Subject headings, classification, keywords for searching on topics
- Date of publication
- Language/country of publication
- Publication type/genre/format.

Sorting on several criteria is required for large result sets and meaningful clustering (e.g. using [IFLA LRM](#) entities) is helpful.

3.7.4 National agencies

Different national and governmental agencies may use the information contained in national bibliographies to assist their work.

Funding bodies may use the national bibliography for their country to:

- Assess the impact of existing funding of national publishing output
- Plan future funding policy.

Government agencies may use the national bibliography to:

- Assess the performance of the national bibliographic agency with regard to government funding.
- Source data relating to the country's publishing output for official statistics.

Information requirements from the national bibliography

Agencies may require the following from the national bibliography to perform their functions.

Descriptive metadata requirements (for offline files or printed national bibliographies)

- Basic publication data (*citation format*).

Search requirements (for online national bibliographies)

- Language of publication
- Language of original
- Country of publication
- Classification code
- Date of publication
- Target audience
- Publication type/genre/format.

3.7.5 Publishers

National bibliographies enable publishers (commercial and non-commercial sector, including government and official publishers) to analyse the national market and potential competition.

Information requirements from the national bibliography

Descriptive metadata requirements (for offline files or printed national bibliographies)

- Basic publication data (citation format).

Search requirements (for online national bibliographies)

- On a topic: search by subject headings, classification number or keyword
- Date of publication
- Publisher
- Publication type/genre/format.

3.7.6 Rights management agencies

National bibliographic data can be used to support the management of intellectual rights by collecting societies, in addition to government bodies for the management of lending right remuneration.

Information requirements from the national bibliography

Descriptive metadata requirements (for offline files or printed national bibliographies)

- Title
- Author/creator/contributor name (any form)
- Relationship information.

Search requirements (for online national bibliographies)

The information needs of this group are more specific than those of other users with two main search scenarios, i.e. search by:

- Author name (any form of the name) to obtain either the complete authority record for the named author or all publications by the named author
- Title to obtain the authors and their roles.

Results required are either: a complete authority record for the named author or a short citation format bibliographic record including relationship information.

When bibliographic records are displayed, meaningful clustering (e.g. according to [IFLA LRM](#) entities) is needed to determine accurate rights attribution.

3.7.7 Software/harvesters

In addition to human users, online national bibliographies can increasingly also be accessed directly by computer software applications. These applications can belong to other libraries and cultural heritage institutions, commercial agencies, metadata aggregators, publishers and others that benefit from using high quality metadata derived from the national bibliography. Such applications include federated or distributed searching and harvesting tools. Such usage poses additional technical and security requirements that need to be taken into account when planning a fully functional online national bibliography.

A growing number of application programming interfaces (APIs) to bibliographic databases exist. The [Bath profile](#) provides explicit guidelines for how to support the ANSI/NISO Z39.50 standard search and retrieval protocol including defined query terms and term combinations.

This may be considered the minimum level interface that should be supported to allow connection from most library management systems.

Many national libraries and national bibliographic agencies also offer users access to their datasets via information retrieval portals. In addition to such national resources there are also international initiatives.

Information systems requirements from the national bibliography

For search, approaches include:

- Distributed searching using [Z39.50](#) or [SRU/SRW](#).
- A central index, created and maintained by harvesting with [OAI-PMH](#).
- An [RDF](#) triple store for use via the Linked Data API or a [SPARQL](#) endpoint.

As the interest in re-use of national bibliographic data increases, it is ever more important to stress adherence to international standards and cross-sector collaboration on standards.

3.8 Examples

This section contains examples of how to integrate national bibliographies into the library infrastructure (Denmark, United Kingdom), as well as a case study relating to investigating the use of a national bibliography (Sweden).

3.8.1 Denmark

Comprehensive integration of the national bibliography in library infrastructure

The vast majority of the Danish National Bibliography is produced by the Danish Bibliographic Centre (DBC). DBC also provides metadata as well as national infrastructure to the Danish library community. Thus, all Danish public libraries use metadata produced by DBC. The national infrastructure includes a true union catalogue for library professionals, DanBib, as well as a union catalogue for citizens, bibliotek.dk (library.dk).

For many years the national bibliography records have constituted the core data elements of the records that DBC provides to all public libraries. This core data is enriched by DBC with further metadata to accommodate library needs. This approach means that:

- All public libraries share records produced by DBC, thus minimising total cataloguing efforts.
- National bibliography data is truly reused in local library systems as the core of library metadata.
- National bibliographic data and library specific data are truly integrated and produced in the same process at DBC

Records produced by DBC go into the union catalogue. From here, complete records as well as filtered records containing only national bibliographic data are distributed in various ways:

- Batch files provided for download on a weekly basis
- Downloadable result sets after searching the union catalogue DanBib web interface
- Downloadable result sets after searching the union catalogue DanBib Z39.50 interface
- Online single record transfer to a cataloguing client for shared cataloguing.

Up until recently, reuse of national bibliography data has been based on replication of records to various systems. Now, the principle of replication is substituted by the principle of genuinely sharing the same physical record ingested into a common national repository.

DBC has migrated the national infrastructure into a service-oriented architecture centred around a common metadata repository referred to as the Danish National Data well. The data well contains the union catalogue records, as well as harvested data sets corresponding to library digital resources and enrichments from library sites, publishers and others. All data sets are interrelated using linked data principles, which means that national bibliography data is not only connected to enhancing library-specific data stored in the same record, but also to heterogeneous, enriching data in other data sets.

On top of the data well reside a number of national web services, which can be looked upon as building blocks. This means that instead of building an entire discovery application with database functionality and user interface with data ingests and updates, new applications can be built simply by building a new user interface on top of the national data well and web services. The user interface can restrict search and retrieval to specified subsets of data in the data well.

Current applications built on top of the national infrastructure building blocks and the national data well comprise:

- Public library discovery interfaces
- Netlydbog.dk, a library consortia platform for patrons to search and stream audiobooks on the internet
- eReolen.dk, a library consortia platform for patrons to search and stream e-books on the internet
- bibliotek.dk, the union catalogue for citizens
- PallesGavebod.dk, a national discovery interface for children.

The integration of national bibliography data in library infrastructure is still evolving. The national data well and web services serve as a discovery platform. Next step is to serve as a common catalogue in the broadest sense. Approximately 90% of the Danish public and school libraries have tendered for a common library management system. The national data well will serve as the catalogue in this new system. A sophisticated data model ensures that libraries, if so wanted, can add to or create alternative data elements to the national bibliographic record without disrupting the National Bibliography. But mostly, libraries just have to add holdings. Any changes that DBC makes in the national bibliographic record will automatically be reflected in the shared system context. The days of initial and updating imports and exports of bibliographic records are over.

3.8.2 United Kingdom

In the United Kingdom, the [British National Bibliography \(BNB\)](#) is a view of data in the production database of the British Library's Integrated Library Management System. The records that form the BNB come from a variety of sources, including [Library of Congress](#); the [Legal Deposit Libraries' Shared Cataloguing Programme](#) and [BDS](#), the British Library's CIP contractor. Since the implementation of the library management system in 2004, a process of continuous improvement has been applied to workflows to improve efficiency and to maximise the reuse of data.

The web catalogue interface provides discrete views of the database to enable users to search the British Library Integrated Catalogue or the British National Bibliography. The view of the BNB includes some material published or distributed in the UK which is not in the library catalogue, either because it has not yet been received or because it is in scope for one of the other legal deposit libraries but not the British Library. New, changed or deleted records are exported from the system every week. The exported records are imported into a set of databases and utilities developed in house. These are known collectively as Catalogue Bridge and provide a flexible set of tools for organising the data and routing it to specific products, such as BNB, for export to customers.

3.8.3 Sweden – a case study on investigating the use of a national bibliography

The National Library of Sweden has conducted a study and produced a report as support and guidance for strategic decisions regarding national bibliographic services (Häusner and Sommerland, 2016). In the study, questions regarding the role of the national bibliography today and tomorrow are investigated.

The report consists of four parts: a historical background, an international web survey, visits to and interviews with representatives of the national bibliographic agencies of Denmark, Germany and Norway and finally interviews with a selected number of known stakeholders.

With the aim to create a basis for discussion on how to interpret the national bibliographic directives given by the Swedish government, the National Library of Sweden appointed a commission to investigate the purposes of the Swedish national bibliography.

The commission executed a study including an international comparison regarding interpretations of national bibliographic directives in selected countries. The main purpose of the international comparison was to gain insight into which different tendencies dominate international discussions concerning these questions. In addition, the commission made a limited user study by interviewing stakeholders regarding their expectations on what purposes the national bibliography might fulfil.

The questions discussed in the report are:

- What are the purposes of a national bibliography?
- What media types should a national bibliography include?
- Who are the users of national bibliographies?

The study is placed in a discourse where future strategic decisions for work with national bibliographies are connected and related to development of work methods with linked open data. In the report, the current established purposes of national bibliographies internationally – to function as mirrors of a country's culture and to serve as an overview of a country's publishing output – are discussed.

The conclusions are that these two purposes still are relevant but need to be complemented with a discussion on what effects and consequences an increased internationalization, digitization and media convergence have on the concepts of “nation” and “nationality” as selection criteria. For example, the effects of digitisation blur the concept of “nation” when it comes to where media is

originally published. This creates new challenges that affect the production of national bibliographies.

By way of conclusion, the following crucial input areas are identified:

- Current knowledge on media and publishing trends
- Increased automated work flows
- Documentation and transparency regarding selection criteria and description levels
- Updated and increased knowledge about the users and their needs
- Discussions regarding the role of legal deposit in relation to the purpose of the national bibliography.

For national bibliographic agencies, it is essential to continuously review the purpose and definition of the national bibliography in different times and contexts, in order to have a stable ground for support and guidance regarding strategic decisions. Considering the Swedish case described here, the study and the report could serve as a model for further analysis and investigation regarding the work with and the development of national bibliographies.

4 Scoping and selection

4.1 Introduction

A critical issue for a national bibliographic agency in the creation and maintenance of its national bibliography is what it should contain. To assist this process, a well-grounded set of selection principles is essential. Since such principles are reflective of the characteristics of any given nation, this is inevitably an area where the greatest scope for variation exists among NBAs.

Online publication has led to an explosion of publishing output in ever increasing forms; however, traditional analogue publishing has not diminished. Judicious selection policies for the national bibliography take on greater importance, to match resources for the production of the bibliography to the available materials.

This section presents an array of selection principles to aid national bibliographic agencies in formulating their specific selection criteria. While no single set of selection principles will be appropriate for every national bibliographic agency, this section aims to provide guidance on the:

- various criteria to be considered
- rationale to be taken into account
- constraints that come into play as each national bibliographic agency tackles the challenge of defining its selection criteria.

From this information, an NBA can create a framework of selection criteria that:

- meets its needs for administering its country's national bibliography
- fulfils any legal mandates of the country.

Despite the increasing move to digital publication, the fundamental basis of selection, i.e. *content and context not format*, remains unchanged. However, new digital formats do bring with them additional and more complicated issues concerning the management and presentation of resources to users. Considering the swift growth and rapidly changing nature of digital resources, NBAs must be vigilant in ensuring their selection criteria reflect the ongoing needs of their users. However, they should also remember that inclusion of digital resources should not negatively impact the comprehensiveness of inclusion for traditional resources.

4.2 International recommendations

The [*final recommendations of the International Conference on National Bibliographic Services: ICNBS: Copenhagen 25-27 November 1998*](#) (2002, October 1) include two recommendations regarding coverage of the national bibliography:

- Recommendation 4 advised NBAs to: “[...] include the current national output, and where practicable also provide retrospective coverage.”
- Recommendation 5 advised to: “[...] include records for materials in all languages and/or scripts in which publications are produced [...]”.

However, Recommendation 4 also acknowledged the impossibility for an NBA to include everything potentially associated with its national interest with guidance that: “When necessary, selection criteria should be defined and published by the national bibliographic agency.”

4.3 General selection criteria

Each national bibliographic agency is responsible for developing its own selection criteria. The information in the sections below provides examples from which NBAs might frame selection policies and present a positive approach to the selection process. However, when establishing selection policies, it can also be instructive to consider what to exclude.

It should be borne in mind that a national bibliographic agency may have decided to archive resources, but may determine not to include a description in the national bibliography (see for example [section 3.4](#)).

An effective NBA collects all relevant resources that will enable it to provide its users with comprehensive content that meets its selection criteria regardless of format. The selection criteria may include geographical or cultural considerations, financial constraints, and consideration of the importance of the content and context. The inclusion or exclusion of digital resources involves additional specific considerations.

4.3.1 Geographical or cultural selection criteria

The geographic or cultural origin of resources is one of the main factors used in determining whether an NBA will select resources for inclusion in the national bibliography. This responsibility can be framed in geographic terms, or in terms of cultural or linguistic identity. NBAs are associated with a territory or region that will define the main collecting scope for the NBA. One of the most basic selection criteria is to include in the national bibliography those resources published in the territory covered by the NBA. This selection criterion fits well with any legal deposit obligations, which make the resources published in the territory available to the NBA to be included in the national bibliography. Resources included based on their geographic origin will often be collected with the aim of exhaustive or at least comprehensive coverage of the formats considered of interest, without any consideration for the content or language of the publications.

In many cases, resources published outside of the territory of the NBA, but considered “related” to the mission of the NBA, are collected and included in the national bibliography, to provide a more comprehensive picture. Possible selection criteria for these related resources include:

- nationality or origin of the authors or creators of the resource
- subject content of the resource
- language used in the resource.

Including resources published outside of the territory of the NBA, but by authors or creators associated with the territory, is particularly significant when authors from the territory of origin publish internationally. This can also permit the inclusion of translations of works considered associated with the territory. The criteria for determining whether an author or creator is considered associated with the territory can include such factors as: the nationality (current or former) of the person, the place of birth or the place of residence (current or former) of the person.

If the criterion of relevant subject content is applied, it needs to be defined to capture resources of the greatest significance. Generally, the portion of the content of the resource that relates to the territory or its nationals needs to be significant. For literature or film, such criteria can include having the territory as an important setting, or having major characters portrayed as being from the territory. Typically, exclusions would be defined to avoid collecting all global surveys or atlases that happen to include the territory along with all others.

Including resources published in the official language of the territory of the NBA, regardless of their place of publication, subject or the origin of their authors, can be significant when the language is strongly associated with a particular territory and few others. This can serve to gather

resources produced by descendants of emigrants who would not otherwise qualify as related authors or creators.

4.3.2 Financial criteria

The financial resources available to the NBA need to be taken into account in determining the selection criteria for the national bibliography. Even in cases where certain publications are received through legal or voluntary deposit and do not need to be paid for by the NBA, the NBA will incur costs as part of the process of including them in the national bibliography. Prioritising the areas or types of materials to be included is one way of producing the national bibliography while respecting the NBA's available financial resources. The future sustainability of the national bibliography needs to be kept in mind.

In making the determination of the NBA's financial capacity, the total cost of including resources in the national bibliography needs to be considered, i.e., costs of the items themselves included together with all costs related to their:

- Cataloguing
- Storage
- Supply
- Preservation.

In order to mitigate some of the financial implications of collection and description, many NBAs also define collecting levels that should be applied for purchased resources (i.e., those resources acquired in addition to those received through legal or voluntary deposit). Such collecting levels may involve focusing the collection development activities on the more significant of the publications that otherwise meet the inclusion criteria (e.g. selecting from trade or scholarly publisher output and not seeking out self-published or grey literature). Although the comprehensiveness of the collection is reduced by such choices, it will still be broadly representative.

Another strategy is to collect only a representative sample of certain categories of resources, such as those of a particular type or format. Harvesting web sites on a more or less frequent basis is a way of applying the representative sample strategy.

4.3.3 Content and context

Given the overriding importance of the content and context in determining inclusion, the following criteria may assist in assessing whether a resource is worthy of selection:

- Intellectual/research/scholarly level
- Likelihood of being archived by another agency/trusted repository
- Value in serving the research needs of future users
- Creator's/publisher's/producer's reputation
- Representativeness of contemporary publication formats
- Vulnerability to loss.

4.4 Digital resources

Digital resources include a variety of formats, e.g.:

- Web sites (including blogs, integrating resources, and other emerging resources)
- Online databases

- E-journals
- E-books
- Distributed on physical media such as CD and DVD-ROMs.

These may be free, subscription fee-based or available for purchase.

4.4.1 Access to digital resources

Digital resources can be linked to, licensed, or acquired and include those accessed directly or remotely:

- Remote access resources are to be used via computer networks
- Direct access resources are to be used via handheld carriers or via insertion into a computer or smart device.

Remote access resources may be:

- Maintained onsite in a secure and permanent digital repository that is managed by the national bibliographic agency
- Stored remotely under the management of an external agency or organisation even if owned by the NBA.

These varying methods of collecting add to the complexity of what is represented in the national bibliography.

4.4.2 Digital resources – selection

The following are potential selection criteria for an NBA developing its policy for the inclusion of digital resources in the national bibliography.

- Unique content (i.e., is the content solely available in digital form?).
- Value in relation to an existing analogue collection (i.e., the resource complements the analogue collection; continues solely in digital form a formerly analogue resource, e.g. a journal that started as print and converted to electronic, no longer continuing the print issues).
- Representativeness of digital ephemera that will be of relevance to future researchers.
- Technical requirements for use, i.e.:
 - Ease of navigation
 - Range of functionality
 - Server reliability
 - Ease of migration
 - Format appropriate for preservation.
- Metadata (is associated metadata readily available?).
- Representativeness of contemporary digital resources.

4.4.3 Digital resources – selective exclusions

The following categories and formats of digital resources are excluded by some national bibliographic agencies. This list may be of use to other NBAs developing or revising their own selection policies.

- Software applications (Apps).
- Bulletin boards.
- Chat rooms.
- Cookies.
- Databases primarily containing statistical and other raw data (e.g. data sets). However, some NBAs are becoming increasingly concerned about scientific research that is only captured in data sets.
- Duplicates of print and other analogue resources.
- Emails.
- Games.
- Informal or incomplete resources (e.g. works in progress, preprints, selected parts of a larger resource).
- Newsgroups.
- Newspapers, i.e., online versions for which print equivalents exist. However, some national bibliographic agencies consider newspapers of great importance.
- Organisational records.
- Retail/advertising sites.
- Theses/dissertations (providing that they are collected by other bodies (e.g. universities)). However, some national bibliographic agencies consider these materials of great importance.

While some NBAs currently deselect some or all of the above resources, there are reasons for inclusion of some categories, e.g.:

- Games are beginning to be viewed as learning tools. Will future researchers require samples of these to see how they evolve in sophistication to support the teaching/learning process? Is gaming a large business and cultural sector for the nation?
- Will samples of retail/advertising sites assist research by future social scientists into the changing cultural and social environment?
- Will vital ground-breaking research recorded solely in data sets be lost if NBAs do not collect and record them in the national bibliography?

4.5 Examples: national bibliographic agencies' selection and exclusion policies

Existing NBAs commonly have established guidance and criteria for selecting print and other traditional analogue materials as well as digital and online resources. Such selection criteria include a wide range of materials (monographs, serials, government documents, etc.) in a variety of analogue forms and digital formats.

Representative examples of NBA selection and exclusion policies include:

- [Austria](#)
- [Canada](#) (see also: [McKeen, L. \(2008, June 4\). *Canadiana, the national bibliography for Canada, in the digital age*](#)).
- [Czech Republic Web Archive](#) and [Further information](#)
- [Germany](#)
- [Iceland](#)
- [New Zealand](#)
- [Serbia](#)
- [Switzerland](#)
- [United Kingdom](#)
- [United States.](#)

5 Resource description and standards

Adoption of internationally approved standards and principles is crucial for NBAs responsible for disseminating bibliographic records for national and international exchange. Such bibliographic standards include:

- Conceptual models and principles
- Cataloguing rules
- Authority control
- Subject indexing standards and Classification schemes
- Identifiers
- Metadata formats
- Script conversion
- Character sets.

National libraries have long advocated standardisation of exchange formats, cataloguing rules and communication protocols as an extension of the IFLA Universal Bibliographic Control (UBC) program.

5.1 Bibliographic control

Efficient collaboration between libraries and other data providers relies upon standardisation. One key issue in this context is bibliographic control (also known as information organisation or bibliographic organisation).

Universal Bibliographic Control is grounded on sharing the effort of resource description, eliminating redundancy by encouraging sharing and re-use of bibliographic data.

A National bibliographic agency (NBA) has the responsibility for providing the authoritative bibliographic data for publications of its own country and for making that data available to other NBAs, libraries, and other communities (for instance archives and museums) through appropriate and timely services with the goal of increasing open access to the bibliographic data;

NBAs, as a part of the creation of authoritative bibliographic data, also have the responsibility for documenting authorized access points for persons, families, corporate bodies, names of places, and authoritative citations for works related to its own country and for making that authority data available to other NBAs, libraries, and other communities (for instance archives and museums).

IFLA Professional Statement on Universal Bibliographic Control, 2012

The [International Conference on National Bibliographic Services \(ICNBS\)](#) recommended that bibliographic records included in a national bibliography should be based on internationally recognised standards.

National bibliographic agencies should adopt national and international standards and principles for cataloguing, identification systems such as ISBN and ISSN, character encoding, authority control, classification schemes, metadata and persistent naming of digital objects.

National bibliographic agencies should encourage work on the harmonisation of bibliographic standards established in respect of all forms of publications.

5.1.1 International cataloguing principles (ICP)

In 2009, the IFLA Cataloguing Section published the [Statement of International Cataloguing Principles \(ICP\)](#) as an update of the Paris Principles adopted in 1961. A [revised version](#) was adopted in 2016. The ICP statement was developed through international consultation in the series of five regional IFLA Meetings of Experts on an International Cataloguing Code (IME ICC) held between 2003 and 2007.

The ICP aim to be applicable to online library catalogues and beyond. The statement aims to guide the development of cataloguing codes and provides “only” general principles. It does not contain any practical cataloguing rules, but provides general principles that can guide cataloguers in decision-making.

The statement is built on the conceptual models of the original IFLA Functional Requirements family which were the approved models at the time of its revision. The next scheduled revision will take the IFLA Library Reference Model approved in 2017 into account.

It covers all types of resources and all types of access points including:

- Subject headings
- Classification numbers
- Standard identifiers.

According to the statement:

- Authority data should control the authorised forms and variant forms of names
- Cataloguing rules should concern authority data as well as bibliographic data.

ICP stresses the importance of interoperability to facilitate the sharing and reuse of metadata.

5.1.2 IFLA Library reference model

The IFLA Library Reference Model (IFLA LRM) is a conceptual reference model for bibliographic information, expressed using enhanced entity-relationship modelling, and covering all aspects of bibliographic and authority data. IFLA LRM is a high-level abstract model; its generic relationships and attributes are intended to be refined and extended as appropriate to various implementations. Administrative metadata, however, is not in scope. IFLA LRM was designed with a view to its integration into linked open data applications. The IFLA namespaces includes a [declaration](#) of the LRM element set.

IFLA LRM consolidates and supersedes the three models in the FR family of conceptual models. IFLA LRM was developed to provide a single, streamlined, and logically consistent model that harmonised the three previous models (FRBR, FRAD and FRSAD). Due to being created by different working groups over many years, the original models took different perspectives on some issues. Although the differences were relatively minor, they still presented challenges for implementation. With the aim of removing these barriers, the FRBR Review Group started work on the consolidation of the models in 2010, approving the model after a world-wide review was held in 2016. IFLA LRM was then approved by the Committee on Standards and endorsed by the Professional Committee in 2017. IFLA LRM continues to be maintained by the Bibliographic Conceptual Models Review Group.

IFLA LRM is end-user focused and highlights five generic user tasks: find, identify, select, obtain, and explore. It defines 11 entities, which are the key objects of interest in the bibliographic universe, connects them with bibliographically significant relationships, and provides for further description using attributes of the entities. IFLA LRM retains the significant

aspects of the models in the FR family, but adds the considerable simplification of a hierarchical structure of entities.

5.1.3 Functional requirements: the FR family of models

The FR family of conceptual models consists of three entity-relationship models covering three distinct aspects of bibliographic and authority data.

- [Functional Requirements for Bibliographic Records](#) (FRBR), published in 1998.
- [Functional Requirements for Authority Data](#) (FRAD), published in 2009.
- [Functional Requirements for Subject Authority Data](#) (FRSAD), published in 2010.

These models are superseded by the IFLA Library Reference Model, approved in 2017.

5.1.3.1 *Functional requirements for bibliographic records-Object oriented (FRBRoo)*

FRBR object-oriented (FRBRoo) was developed, starting in 2003, by a joint working group of the FRBR Review Group and the [CIDOC Conceptual Reference Model \(CRM\) Special Interest Group](#), an International Council of Museums (ICOM) group. FRBRoo is the version in object-oriented modelling language that corresponds to the three entity-relationship models in the FR family of models. FRBRoo is formulated as a compatible extension to the [CIDOC CRM](#), which is an ontology for cultural heritage information. Together, CIDOC CRM and FRBRoo provide a comprehensive conceptual model covering both museum and library information.

FRBRoo version 1.0, issued in 2010, was based on FRBR alone, while [FRBRoo version 2.4](#), issued in 2015, also covers the FRAD and FRSAD models. It was endorsed by the IFLA Professional Committee in 2016, following a world-wide review. Work is underway to align the object-oriented model with IFLA LRM, which will result in LRMoo superseding FRBRoo.

The [element set](#) for FRBRoo version 2.4 is included in the IFLA namespaces.

A [definition](#) of FRBRoo was created by the IFLA Working Group on FRBR/CRM Dialogue.

5.1.4 PRESSoo

PRESSoo is a formal ontology intended to capture and represent the underlying semantics of bibliographic information about continuing resources, and more specifically about periodicals (journals, newspapers, magazines, etc.). PRESSoo is an extension of FRBRoo version 2.4, which in turn is an extension of CIDOC CRM.

Continuing resources pose a particular modelling issue, in that their descriptions do not only reflect characteristics of existing products, but also, as long as the described resource still is being published, the expected characteristics of future behaviour. PRESSoo declares an event-oriented model to clearly describe the behaviour of periodicals.

PRESSoo originated in 2013 from a collaboration between the ISSN International Centre and the Bibliothèque nationale de France. Version 1.0 was endorsed by the FRBR Review Group in 2014, and subsequently endorsed as a [CIDOC CRM extension](#). After a world-wide review, [PRESSoo version 1.3](#) was approved by the Committee on Standards in 2016, and subsequently endorsed by the Professional Committee as an IFLA standard.

Review and maintenance of PRESSoo is included in the mandate of the Bibliographic Conceptual Models Review Group, working jointly with the CIDOC CRM Special Interest Group.

5.2 Bibliographic content standards

Adherence to content standards ensures consistency in the published bibliography.

Content standards specify:

- Which information is to be recorded
- How it is to be presented.

Content standards may also include guidelines and instructions concerning the most authoritative source of information within a resource.

5.2.1 Bibliographic description

A primary function of the national bibliography is the accurate bibliographic description of the works it contains. Rules for the creation of bibliographic descriptions have evolved in sophistication over the years and have developed from institutional, to national and ultimately global standards. NBAs should ensure that their metadata is created according to a recognised bibliographic description standard in order to ensure the utility, interoperability and efficiency of their bibliographic services.

5.2.1.1 *Cataloguing rules compatibility*

Compatibility of cataloguing rules is as essential as compatibility of formats. While formats govern the structure of metadata, cataloguing rules govern its content.

Two events marked the start of international initiatives on the definition of compatible cataloguing rules:

- In 1961, the Paris Principles made recommendations on the choice, form and structure of headings for names and for titles
- In 1969, the IFLA International Meeting of Cataloguing Experts held in Copenhagen (Chaplin, Anderson & Honoré, 1970) produced a resolution that proposed creation of standards to regularise the form and content of bibliographic descriptions.

5.2.1.2 *Core national bibliographic elements*

The starting point for selecting core metadata requirements is the analysis of uses of the national bibliography, since use is only possible if appropriate metadata are available. Users will inevitably have different needs relating to standard functions, such as **find**, and may even have unique requirements. National bibliographic agencies should avoid creating metadata of specific use solely to individual users although they may offer a facility for users to assign their own tags or annotations.

Analysis of user requirements should go beyond requirements for resource discovery as articulated by the IFLA Library Reference Model and the Statement of International Cataloguing Principles, and should also take account of requirements for

- Publishing activities, such as:
 - Rights management
 - Market research.
- Library functions, such as:
 - Collection management
 - Derived cataloguing

- Data management.

Some data elements required to support these functions are not normally considered to be in scope for resource description. It is not recommended that NBAs should create this information but instead, where possible, NBAs are encouraged to link to trade sources and to reuse metadata created by other agencies.

5.2.1.3 *Granularity of description*

A basic decision upon metadata requirements has to be made concerning the unit described. Does the metadata of a national bibliography pertain to a collection, to a resource, or even to parts of a resource? User needs as well as the national bibliographic agency's capacity, together with the amount of the national output and the material collected, will affect this decision.

- **Collection-level description** consists of metadata describing a collection as a whole, in contrast to manifestation-level description. The application of collection-level description for national bibliographic agencies may lie in the national bibliography coverage of special material, such as learning objects, web sites or some types of collections like ephemera. Collection-level description for library collections has not been subject to standardisation.
- **Title description:** library metadata most commonly describes resources – documents in any physical form, treated as an “entity”. The resource forms the basis of the bibliographic description. If a national bibliographic agency also decides to cover electronic resources from the web, it may at the same time find it impossible to cover all of the increased national output on a title-level description.
- **Component description:** an NBA may, in some cases, decide for the description of resources such as journal articles, chapters and other parts of monographs, individual tracks on sound recordings, and other types of “works within works”. This lowermost level description may be useful for special collections as an “analytic” finding aid. A framework for this level of description exists with the [Guidelines for the application of the ISBDs to the description of component parts](#).

5.2.1.4 *Level of description detail*

The NBA's responsibility to create extensive records of its national imprint as recommended by the 1977 Paris conference and affirmed by the 1998 Copenhagen International Conference on National Bibliographic Services (ICNBS) was predicated on predominantly print resources and is no longer sustainable.

The national output now includes a substantial proportion of electronic resources. The expansion of the national output may therefore exceed the capacity of the NBA to comprehensively process resources. A graduated approach will therefore be required in which the level of descriptive cataloguing appropriate to different types of resource will be determined in relation to:

- The level of metadata already associated with the resource
- The significance of the resource for the national bibliography
- Its content, not its carrier.

The first recommendation represents a significant change of approach to the creation of the national bibliography and implementation of cataloguing levels will have a direct impact on users which NBAs must therefore consider. In addition, processes must be simplified and, where possible, automated. Additional efficiency should also be gained via cross sector collaboration and by elimination of barriers to data exchange.

Four potential levels of description are recommended:

- Authoritative
- Comprehensive
- Enhanced
- Basic.

Authoritative level description:

- Denotes the highest level of metadata assigned to a resource
- Offers the most flexible support for resource discovery
- Includes (specified) access points that are controlled by authority records
- Conforms to explicit content standards
- Is the most expensive category to assign but NBAs can have confidence that the record can be reused with minimum intervention

Authority control:

- Over name, title and subject access points supports accurate identification of resources
- Of names and titles supports clustering for economy of display
- Reference structure supports navigation to related resources, identities or topics.

It is recognised that creating authoritative metadata for all potential resources is likely to be beyond the capacity of most NBAs. Thus, such agencies must develop criteria to determine which parts of the national output should receive this level of description. The guiding principle should be the value of the content of the resource rather than its format or carrier.

One version of an authoritative level description is found in the 1998 *FRBR final report*, chapter 7: Basic requirements for national bibliographic records. The minimum data elements required in the “Basic Level National Bibliographic Record”, given in section 7.3, are intended to be sufficient to allow the end-user to accomplish the user tasks defined in the model. It should be noted that the FRBR Basic Level record:

- Is basic in name only and is actually sophisticated metadata which satisfies requirements necessary to support the user tasks: **find**, **identify**, **select** and **obtain** defined by FRBR as fundamental to resource discovery.
- Specifies relationships between the resource described and other entities. The identification and description of such relationships support subsidiary functions such as exploration and database clustering.
- Is expensive to produce and extending use of such records to match increased output of traditional and electronic media would be a challenge for most NBAs.
- Is rooted in traditional concepts of bibliographic control. If these concepts are still valid in the digital age the library community must find ways to streamline the processes required to produce this level of metadata more efficiently.

Comprehensive level:

- Denotes assignment of extensive metadata for description and access
- Explicitly conforms to published content standards but there is no commitment to support any access points with authority records
- Does not fully support user tasks.

Failure to control access points with authority records inhibits clustering in displays, resulting in multiple sequences for individual entities, such as names of authors, works or topics and a degradation of service to the user. The **find** task is not fully supported, navigation between resources is compromised and unambiguous identification of resources will be constrained.

Enhanced level description:

- Indicates that the basic resource has been supplemented by assignment of some metadata.
- May not explicitly indicate the content standards used nor is there any commitment to authority control of access points. Note: the absence of clear identification of content standards means the NBA cannot be certain of the consequences to the users.
- Is not recommended for use in national bibliographies and should be upgraded over time if it is to be incorporated into the national bibliography.
- Does not adequately support resource discovery tasks.

Basic level description:

- Assumes no metadata have been assigned to the resource, either by the bibliographic agency or by the source
- Is likely to include web resources harvested directly with no metadata or metadata produced by automatic processing
- May be enhanced over time if it is to be incorporated into a national bibliography
- Is the most economical for the NBA to create, but the most expensive for the agency to upgrade.

Resource discovery is entirely dependent on natural language searching with results returned corresponding to the query terms used. In a standard web interface results will be ranked for display and this approach is most effective when the resource being sought is readily distinguished, (e.g. by its terminology), or when the user has a general information requirement that may be satisfied from a range of similar resources.

Provision of resource discovery at basic level is achieved by transferring costs to the end user who will not be able to navigate to related resources other than by native links present. Huge result lists may however make it difficult to refine results sufficiently to select a specific resource.

5.2.2 Cataloguing rules

Whereas the ISBD is the standard that determines the data elements to be recorded, it is not an instruction manual itself. Most cataloguing rules that were developed by national bibliographic agencies or library associations in the near past were based on the ISBDs.

5.2.2.1 *International standard bibliographic description (ISBD)*

The International Standard Bibliographic Description ([ISBD](#)) is a set of rules produced and maintained by the IFLA [ISBD Review Group](#).

“The ISBD’s main goal is [...] to offer consistency when sharing bibliographic information.” (<http://www.ifla.org/about-the-isbd-review-group#objectives>).

A [consolidated edition](#) was published in 2011, combining separate ISBDs for monographs, cartographic materials, serials and other continuing resources, electronic resources, non-book materials, and printed music. The consolidated ISBD simplifies the application of ISBD and reflects the increasing significance of electronic carriers for all content types.

ISBD regularises the form and content of bibliographic descriptions. It mainly deals with description of resources and is not directly concerned with access points or authority control since it was created long before the possibilities offered by computerised data processing were understood.

ISBD determines the data elements to be recorded or transcribed in a specific sequence as the basis of the description of the catalogued resource. While being the common standard on which numerous cataloguing rules are based, ISBD is not itself an instruction manual for cataloguing national bibliographies. National cataloguing rules are nearly all derived from the ISBD, but with a number of significant interpretations.

A key advantage of ISBD is that it is a concise rule set that produces an easy to understand, human readable representation of a bibliographic record that can be understood without knowing the language of the resource.

The ISBD, among other sources, was examined in determining the FRBR attributes, and the ISBD Review Group has produced a [Mapping of ISBD elements to FRBR entity attributes and relationships](#). The ISBD Review Group also maintains an ISBD RDF/XML schema, to enable libraries to publish their metadata as [linked data](#).

5.2.2.2 *National cataloguing rules*

National cataloguing rules provide guidance on the selection and construction of access points and may cover other aspects of cataloguing, such as authority control, about which ISBD is silent.

Examples of national cataloguing rules include:

- Regole italiane di catalogazione REICAT (2009)
- Chinese Cataloguing Rules (CCR2).

Anglo-American Cataloguing Rules second edition (AACR2), originally a multi-country rule set, was widely translated and adopted far beyond its original audience. The last update to AACR2 was issued in 2005, when Resource Description and Access (RDA) began to be developed.

5.2.2.3 *International cataloguing instructions*

International cataloguing instructions Resource Description and Access (RDA) was designed as a successor to the widely used AACR2. Its first release based on FRBR and FRAD, RDA was developed to enable the description of any resource in an electronic environment. It is independent of format and display. It was released in 2010, in print format and as an online tool, the RDA Toolkit. The RDA Restructure and Redesign (3R) project, completed in 2021, included a complete redesign of the RDA Toolkit and alignment with the IFLA LRM conceptual model. RDA has been translated into several languages, all of which are integrated into the RDA Toolkit. The [RDA Registry](#) contains linked data representations of all the elements provided for in RDA. Maintenance of the standard is the responsibility of the RDA Steering Committee (RSC).

The British Library, Library and Archives Canada, the Library of Congress and the National Library of Australia implemented RDA in 2013. Many NBAs followed.

More information on RDA can be found on the following sites:

- [RDA Steering Committee](#)
- [RDA Toolkit site](#).

5.2.3 Authority control

Authority control (or access point control) refers to the normalisation of controlled access points (headings) and the provision of alternative and related access points. Authority control:

- Supports the **find** function through the collocation of works by a given author or the collocation of anonymous works by title
- Supports the **identify** function via the disambiguation of names of persons, corporate bodies or titles of works and expressions
- Is also used to identify and relate resources by subject.

Controlled access points for authorised, variant forms created for authority control and the relationships between authority records underpin navigation by end users.

Authority control remains a predominantly manual process and automation of the process is a precondition for scalability. [ISNI](#) aims to deliver machine readable identifiers for names.

Projects such as [VIAF](#) and [People Australia](#) are experimenting with automated matching of authority data. Publishers are increasingly aware of the potential contribution automated authority process can make to rights management and developing automated approaches to identification of authors, e.g. Elsevier's [SCOPUS](#) service.

IFLA has published [Guidelines for Authority Records and References](#), which describes the traditional process and principles for creating authority data (International Federation of Library Associations and Institutions, Working Group on GARE Revision, 2001).

5.2.3.1 *Level of authority control*

The scope of the national bibliography should be reflected in the scope of the authority file. Thus, NBAs that include journal articles in the national bibliography should include the authors and contributors to those articles in the authority file. In practice however, most NBAs cannot afford to catalogue articles and are unable to create authority records for their authors. This is an area for stimulating research into more efficient approaches to authority control.

5.2.3.2 *Scope of authority control*

The NBA is responsible for “establishing the authoritative form of name for its country’s authors, both personal and corporate, and authoritative lists of its country’s authors, both personal and corporate” (Anderson, 1974). In practice many countries do not confine their authority list to “national” names but include names of any author whose works have been published or distributed in the country. The scope of authority files may also extend to other entities, such as works and expressions.

5.2.3.3 *Co-operative initiatives*

Authority control is an expensive process. Various international initiatives exist with the objective of reducing the cost of authority control through co-operation. Such initiatives also contribute significantly to the ease of searching in a heterogeneous environment. Examples of projects include:

- Virtual International Authority File (VIAF)

[VIAF](#) is a collaborative effort which brings together authority files from national libraries and other organizations so that authority data for a given entity is linked together into a “super” authority record. It began as a joint project involving the Library of Congress, the Deutsche Nationalbibliothek, the Bibliothèque nationale de France and OCLC. In 2017, contributors included 43 agencies in 36 countries.

- LC/NACO Authority file

The [LC/NACO Authority file](#) is an international name authority file maintained cooperatively by the Library of Congress and the Name Authority Cooperative Program (NACO). It contains over 9 million records and involves hundreds of contributing libraries and programmes around the world. It is a core activity of the [Program for Cooperative Cataloging](#) (PCC).

5.2.3.4 *Authority control standards*

Standards for authority files were often part of national cataloguing rules like AACR2 or *Regeln für die alphabetische Katalogisierung* (RAK) in the past. With the development of RDA as an internationally used cataloguing instruction set, RDA authority control requirements are becoming broadly used within the global library community. The content designation – the codes and conventions established explicitly to identify and further characterise the data elements within a record and to support the manipulation of that data – is defined by each of the formats. The content of the data elements that comprise a formatted record is usually defined by standards outside the formats.

Examples of authority formats:

- The [UNIMARC Authorities Format](#) (UNIMARC/A) is published by IFLA and is a companion format for the UNIMARC Bibliographic Format (UNIMARC/B).
- The [MARC 21 Format for Authority Data](#) is another widely used format for the representation and exchange of authority files.
- [MADS \(Metadata Authority Description Schema\)](#) is an XML standard for an authority element set.

Examples of authority standards:

- [GARR](#), the Guidelines for Authority Records and References, produced by IFLA, is a standard for creating authority data.
- [ISAAR \(CPF\)](#), the International Standard Archival Authority Record for Corporate Bodies, Persons and Families was published in 2004 by the International Council on Archives for archival authority records, to accompany ISAD(G), the General International Standard Archival Description. It is a real content standard.

5.2.4 Subject standards

IFLA recommends provision of subject access to national bibliographies. The IFLA Subject Analysis & Access Section has developed specific guidelines which have been made available in [printed form](#).

5.2.4.1 *Subject indexing schemes*

Subject indexing schemes provide controlled access to the content of resources. Schemes define concepts and relationships between concepts to support user navigation.

The [Library of Congress Subject Headings](#) (LCSH) have been maintained by the Library of Congress since 1898, and are used for cooperative cataloguing around the United States as well as internationally, often in translation.

Well-known national subject indexing schemes include:

- The 2006 published Italian system [Nuovo Soggettario](#)
- The Canadian French language scheme [RVM](#) (Répertoire de vedettes-matière de la Bibliothèque de l'Université Laval)

- The French language [RAMEAU](#) (Répertoire d'autorité-matière encyclopédique et alphabétique unifié).

5.2.4.2 *National and international initiatives*

Subject indexing schemes express concepts in a way that is language-dependent. National or multi-national initiatives to promote the interoperability of subject indexing across language barriers can involve intellectual mapping or matching of terms representing the same concept. Examples of multi-national, multi-lingual initiatives include:

[MACS \(Multilingual Access to Subjects\)](#) was a collaborative project involving the British Library, Deutsche Nationalbibliothek, Bibliothèque nationale de France and the Swiss National Library with the objective of providing multilingual subject access on the basis of the indexing schemes LCSH, GND and RAMEAU.

5.2.4.3 *Subject classification schemes*

IFLA recommends the adoption of subject classification schemes for arrangement of the national bibliography. Classification schemes may be directly related to the subject scheme used or independent schemes.

Examples of widely used, universal classification schemes include:

- [Dewey Decimal Classification](#) (DDC). The most widely used universal classification scheme in the world. About 60 national bibliographies are organised by the DDC system which has been translated into over 30 languages over the years.
- [Universal Decimal Classification](#) (UDC). UDC is a popular and widely used classification scheme. It is used over 130 countries around the world and is has been translated into over 40 languages overs the years.
- [Library of Congress Classification](#) (LCC). LCC is commonly used in academic libraries across the world.

5.3 **Identifiers**

An identifier is an association between a string (a sequence of characters) and an information resource. That association is made manifest by a record that binds the identifier string to a set of identifying resource characteristics.

National bibliographic agencies often act as the national maintenance agency for standard identifiers and take responsibility for their assignment. In other countries the role may be assumed by a trade, standards or commercial organisation.

Standard identifiers support interoperability throughout the supply chain. They are an essential component of resource description and an indicator that a resource has been formally published. National bibliographic agencies can use standard identifiers to locate additional metadata for resources and the following product identifiers are commonly used in national bibliographies:

- [International Standard Book Number](#) (ISBN) for print and electronic books
- [International Standard Serial Number](#) (ISSN) for print and electronic journals

It is strongly recommended that NBAs retain standard identifiers whenever associated with resources or recorded in accompanying metadata.

It is recommended that NBAs should be responsible for the assignment of relevant standard identifiers related to materials represented in the national bibliography (e.g. ISBN, ISSN, ISNI).

5.3.1 Local or system control numbers

Library management and other bibliographic database systems commonly assign local system control numbers to bibliographic records. However, these are primarily for internal database maintenance and of limited external value to users. Local system identifiers commonly change on migration from one system to another or with database management initiatives and they are therefore unreliable for long term identification purposes.

It is recommended that NBAs assign and maintain some form of unique bibliographic identifier for each record supplied to users in order that these can be managed effectively over time.

5.3.2 National bibliography number (NBN)

Although the [NBN](#) is not yet a formal standard, details of the proposed specification are [available](#).

The purpose of the NBN is to enable persistent resource identification and the NBN enables each entry in the national bibliography to be unambiguously referenced. It is recommended that:

- The NBA assigns an NBN to each record created for the national bibliography.
- The NBN is published as part of each entry for each resource described in the national bibliography.
- NBNs are not reused.
- NBNs of both entries are retained should it be necessary to merge duplicate entries and the NBN of the superseded entry should be marked as superseded.

Further issues for consideration:

- Guidelines adopted by each national library define when different versions of a work should be assigned the same or differing NBNs. This only applies if assignment is manual.

No resolution system is defined for the NBN. It is suggested in the registration document that resolution would be through national bibliographic databases, or through web indexes or archives.

5.3.3 Persistent identifiers

Persistent identifiers are identifiers that can be cited to retrieve digital objects over a long period of time. Such identifiers enable resources to be accurately identified by reconciling a publicly visible ID to the current address of the metadata or content in a catalogue or digital store even when this changes over time. As national bibliographies develop online or linked data services the issue of permanent identifiers for citation and linking is becoming increasingly crucial at the international level.

More information on persistent identifiers can be found in the [Bibliothèque nationale de France's policy statement on identifiers \(2021\)](#).

5.3.3.1 *Persistent URL (PURL)*

The [Persistent Uniform Resource Locator \(PURL\)](#) was developed and implemented by OCLC as a naming and resolution service for general internet resources. It is administered by the Internet Archive since September 2016. A PURL looks just like a URL, except it points to a resolution service instead of the actual location of the digital resource. The resolution service then redirects the user to the appropriate URL.

5.3.3.2 *The Handle system*

The [Handle system](#), developed by the Corporation for National Research Initiatives (CNRI) is “a comprehensive system for assigning, managing, and resolving persistent identifiers, known as “handles,” for digital objects and other resources on the internet” (Handle System Introduction), through a global handle service.

5.3.3.3 *Digital Object Identifier (DOI)*

The development of the [Digital Object Identifier \(DOI\)](#) system was initiated by the [Association of American Publishers](#), and is now managed by the [International DOI Foundation](#). The DOI system of unique identifiers is based on the Handle system and allows the allocation of a unique digital identifier to commercial digital publications.

5.3.3.4 *Archival Resource Key (ARK)*

The [Archival Resource Key \(ARK\)](#) system is location and protocol independent and is an alternative approach to persistent identification. It was developed in 2001 by John Kunze for custodians of archived digital objects, and emphasises the principle of stewardship of resources and their naming schemes over time.

The ARK identifier is a naming scheme for persistent access to digital objects (including images, texts, data sets, and finding aids) implemented by the [California Digital Library \(CDL\)](#).

The ARK identifier is a specially constructed, globally unique, [actionable URL](#) and the ARK scheme is underpinned by three requirements based on links:

- From the object to a promise for stewardship
- From the object to metadata which describes it
- To the object itself (or appropriate substitute).

5.3.4 Web identifiers

5.3.4.1 *Uniform Resource Identifier (URI)*

The [Uniform Resource Identifier \(URI\)](#) or Internationalised Resource Identifier ([IRI](#)) is a series of characters formulated to uniquely identify a resource, most commonly on the web, and enable interaction with it via common protocols such as HTTP, FTP, etc. The URI specification is maintained by the [World Wide Web Consortium \(W3C\)](#) who also have documented the relationship between the different forms of [addressing](#) used on the web. URNs and URLs are forms of URI. URIs are increasingly used to identify linked data resources where literal text values originating in a bibliographic record are replaced by URIs linking to database record identifiers (e.g. when replacing the text of an author’s name with a URI linking to the [VIAF](#) record for the author).

5.3.4.2 *Uniform Resource Locators (URLs)*

[Uniform Resource Locators \(URLs\)](#), both identify and locate a web resource via inclusion of a protocol syntax, domain name and the name of the file within which a resource resides. A URL does not ensure a link to a resource is maintained if it is moved within its repository.

5.3.4.3 *Uniform Resource Name (URN)*

A [Uniform Resource Name \(URN\)](#) is a type of URI and is a standard, persistent and unique identifier for digital resources on the internet. To link to the resource from the URN, a resolver service is required.

5.3.5 Specific identifiers

In addition to core bibliographic identifiers such as the [International Standard Book Number \(ISBN\)](#) for books and [International Standard Serial Number \(ISSN\)](#) for serials, other new and established identifiers are of interest to NBAs. This section outlines some of the most important.

5.3.5.1 *ISAN*

The [International Standard Audiovisual Number \(ISAN\)](#) is an international standard (ISO 15706-1 & 15706-2) audiovisual work identifier. ISANs are unique, permanent reference numbers for audiovisual works registered in the ISAN system and may be applied to all types of audiovisual work.

5.3.5.2 *ISMN*

The [International Standard Music Number \(ISMN\)](#) is a standard identifier (ISO 10957), “a unique number for the identification of all notated music publications” and is well established as an identifier for printed music.

5.3.5.3 *ISNI*

The [International Standard Name Identifier \(ISNI\)](#) is an international standard identifier (ISO 27729) for persons or corporate bodies and has obvious application in authority control, rights management and resource discovery.

The ISNI is conceived as a cross-domain system acting as a “bridge identifier” with uses beyond the traditional library world and therefore as a potentially important component in the development of linked data services.

5.3.5.4 *ISRC*

The [International Standard Recording Code \(ISRC\)](#) is a standard persistent identifier (ISO 3901:2001) for sound and music video recordings. The ISRC can be encoded directly into the product to provide a digital fingerprint and is fundamental to royalty collection in the digital age. The International ISRC Agency is developing a standard minimum metadata set for use with the identifier.

5.3.5.5 *ISWC*

The [International Standard Musical Work Code \(ISWC\)](#) is a standard identifier (ISO 15707:2001) designed to uniquely and accurately identify musical works. It is a permanent identifier which identifies a work across political and linguistic boundaries rather than expressions or manifestations of works and thus does not identify recordings, publications or broadcasts of the work. The ISWC has many potential applications in tracking and exchanging information about musical works, e.g. royalty distribution.

5.3.6 New developments

Unambiguous identifications of entities (persons, corporate bodies, works, etc.) are essential precursors to machine to machine operations, and more identifiers are being developed. Identifiers such as [ISBN](#) and [ISSN](#) are concerned with products (manifestations in IFLA LRM terms). The new generation of identifiers deals with works and expressions and therefore can facilitate the identification of relationships between manifestations and people or institutions.

5.4 Metadata formats

Traditionally, libraries have exchanged metadata in domain specific formats such as MARC (MACHine Readable Cataloging) and offered some limited text-based download formats to end users. In the latter case there has been limited standardisation although some library catalogues have supported personal bibliographic citation management tools such as [EndNote](#). More recently, libraries have begun to offer metadata in less proprietary formats (e.g. [RDF](#)), often as part of [open data](#) initiatives designed to make their metadata more accessible to wider user communities.

5.4.1 MARC formats

For encoding their descriptions, most libraries are still using MARC (MACHine Readable Cataloging) formats which are applications of the [ISO 2709](#) file standard. This family of formats originated at the Library of Congress in the 1960s and has been expanded ever since. While the majority of library software available still uses variations of the MARC format, various alternatives based on more modern technologies are becoming available. NBAs should bear in mind the formats that are useful to their users.

5.4.1.1 UNIMARC

To address the multiplicity of MARC formats, IFLA fostered the development of an international format dedicated to the exchange of bibliographic data among national libraries. Although [UNIMARC](#) was originally designed to be an exchange format, it has been developed by a number of countries to become a production format. It has also been used by UNESCO for its library products, mainly to help developing countries move to automated library management systems and standard data formats. UNIMARC consists of a set of four formats:

- Bibliographic
- Authorities
- Classification
- Holdings

IFLA's [Permanent UNIMARC Committee \(PUC\)](#) maintains and develops the UNIMARC format.

5.4.1.2 MARC 21

MARC 21 is the product of the integration of USMARC, UKMARC and CAN/MARC. It is the most extensively used MARC format in the world and a *de facto* standard. It has been designed to be both a production format and an exchange format. There are five MARC 21 formats:

- Bibliographic
- Authorities
- Holdings
- Classification
- Community information

The maintenance agency for MARC 21 is the [Library of Congress](#) which offers support documents on the formats with several translations including: [Understanding MARC Bibliographic](#), and [Understanding MARC Authority Records](#). The French translations of the MARC 21 formats are maintained by [Library and Archives Canada](#).

5.4.1.3 *National MARC formats*

Many countries have developed national versions of MARC, in order to accommodate local practices.

Recent years have seen a convergence upon the MARC 21 and UNIMARC formats by many countries, with little development of new MARC formats.

5.4.2 The Dublin Core Metadata Initiative (DCMI)

The [Dublin Core Metadata Initiative \(DCMI\)](#) is an organisation dedicated to promoting the widespread adoption of interoperable metadata standards and developing specialised metadata vocabularies.

The initiative began in 1995 with a workshop in Dublin, Ohio, that brought together librarians, digital library researchers, content providers, and text markup experts to improve discovery standards for information resources. The original Dublin Core emerged as a small set of descriptive elements that quickly drew global interest from a wide variety of information providers.

5.4.2.1 *DC metadata element set*

The Dublin Core metadata element set is an [ISO Standard \(ISO 15836\)](#), well known in the web and library worlds as a cross-domain standard that defines 15 data elements for resource description.

The Dublin Core Metadata Element Set – Reference Description has been translated into 24 languages.

5.4.2.2 *DCMI library application profile*

The concept of [application profiles](#) emerged within the Dublin Core Metadata Initiative as a way to declare which elements from which namespaces are used in a particular application or project. Application profiles are defined as schemas which consist of data elements drawn from one or more namespaces, combined together by implementers, and optimised for a particular local application.

5.4.3 XML formats

All mark-up languages are derived from the [Standard Generalized Mark-up Language \(SGML\)](#), which was used in the 1980s in professional environments for technical and scientific publishing. Based on the same “grammar”, the different “formats” are linked to record profiles called [Document Type Descriptions \(DTD\)](#).

The [Extensible Markup Language \(XML\)](#) is widely used across many different communities and enables more functionality than traditional MARC formats. Because of its flexibility and extensibility, it supports the expression of different data models. XML is accepted as an industry standard and therefore facilitates interoperability across sectors and is generally easier to process than alternative options. XML is also more powerful for the presentation of hierarchical or analytical information and allows good link management between bibliographic (and authority) records and digital resources.

XML formats are used in the library and archives world, as well as in the publishing and book trade industry.

5.4.3.1 *MARXML*

[MARXML](#) is a [Document Type Descriptions \(DTD\)](#) describing the MARC 21 format in XML. MARXML is used in many applications at the Library of Congress and in OCLC WorldCat and

was designed to assist the evolution of bibliographic formats towards XML, while maintaining compatibility with existing bibliographic data.

5.4.3.2 Metadata Object Description Schema (MODS)

[Metadata Object Description Schema \(MODS\)](#) was created by the Library of Congress' [Network Development and MARC Standards Office](#) together with other interested experts as a multi-function bibliographic element set schema with particular value for library applications.

As an XML schema, MODS is intended to be able to carry selected data from existing MARC 21 records as well as to enable the creation of original resource description records. It includes a subset of MARC fields and uses language-based tags rather than numeric ones, in some cases regrouping elements from the MARC 21 bibliographic format.

MODS is expressed using the [XML schema language](#) of the W3C. The standard is maintained by the Network Development and MARC Standards Office of the Library of Congress with input from users.

5.4.3.3 Online Information eXchange (ONIX)

[Online Information eXchange \(ONIX\)](#) is a group of related XML standards for [books](#), [serials](#) and [publishing rights information](#).

ONIX for Books was the first of the standards to be widely adopted by the book trade and was developed by [EDItEUR](#) with [Book Industry Communication \(UK\)](#) and the [Book Industry Study Group \(US\)](#) and is currently maintained with the guidance of an International Steering Committee. The ONIX for Books Product Information Message is a *de facto* international standard for the electronic communication book trade product information.

ONIX for Books is a very comprehensive and sophisticated format, in order to allow as much functionality as possible in the different environments. The most widely implemented release, ONIX 2.1, was the first truly international descriptive metadata format to be adopted by the book industry, and its successor, [ONIX 3.0](#), has been further enhanced for e-books.

Libraries have long been interested in the potential for using publisher information as a basis for catalogue records in order to improve efficiency. Publisher migration from proprietary local formats to ONIX has made this a more realistic proposition by reducing the overhead in maintaining multiple translations to MARC. NBAs responsible for maintaining a CIP programme often accept ONIX formatted files as notification of forthcoming titles from publishers. Details of [ONIX to MARC 21 mappings](#) created by OCLC and the Library of Congress can be found on the EDItEUR web site.

5.4.3.4 Bibliographic framework initiative (BIBFRAME)

[BIBFRAME](#) is an initiative led by the Library of Congress to explore the transition from the long-established MARC 21 format via the creation of a new bibliographic data model and [vocabulary](#) optimised for use on the web. Although BIBFRAME is being designed to cater for library specific needs, it will also support the needs of the wider information community and offer new opportunities for integration. The initiative is investigating a range of bibliographic data issues including:

- Description and cataloguing rules
- Creation via new means of data entry
- Exchange protocols and methods
- Accommodation of varying content models.

A number of libraries have begun to experiment with BIBFRAME and, while not yet in a final stable form, it has excited considerable interest and debate in the library community. The Library

of Congress has created a list of [frequently asked questions](#) for BIBFRAME in order to address many of the common queries.

5.5 Metadata transmission standards

This section provides information on standards and best practice relating to the exchange of bibliographic metadata via file transfer including:

- File naming and labelling
- Data interchange formats
- File compression.

5.5.1 File naming and labelling conventions

In the absence of international standards in this area, it is good practice for NBAs to establish, maintain and publicise conventions relating to the naming and labelling of data files supplied from their sites.

5.5.1.1 *File naming*

Unique file names created in a consistent form should ideally assist both machine and human processing of the files themselves by incorporating elements conveying:

- File format (e.g. by a suffix such as .mrc to indicate a MARC exchange file)
- The content of the file (e.g. via a prefix such as NB for “National Bibliography”)
- Some indication of the issue, part or date of the file contents (e.g. 20140906 for a file covering material released on September 6th 2014 or 2058 for issue 2058 of a national bibliography)
- Sub-component number if a larger data file has been split for ease of transmission.

5.5.1.2 *File labelling*

In addition to formal naming conventions, it is also good practice for NBAs to supply text files as summaries to accompany data files and to document their contents. Such files should ideally contain basic statistical information describing the contents of the file (numbers of new, changed or deleted records, total number of records contained in the file, etc.).

The use of such text files can greatly assist users in verifying that they have received a complete copy of the file.

5.5.1.3 *Non-specialist file compression formats*

While the long established [Format for Information Exchange](#) (ISO 2709) enables the efficient transmission of compressed MARC data, other non-MARC text based data formats ([CSV](#), XML, etc.) lack a common standard. Instead, general file archiving tools ([ZIP](#), [TAR](#), etc.) are often used to enable more efficient and rapid file transfer of data.

Such tools can also simplify the management of multi-file sets by enabling files to be combined into a single archive together with any related documentation. Additionally, NBAs may use generic compression tools (e.g. TAR) to package multiple files of ISO 2709 formatted MARC data together with relevant documentation.

5.5.2 Specialist bibliographic transmission standards

Libraries commonly use specialist formats for the distribution of MARC data based on the [ISO 2709 standard](#) that can be easily imported by library management systems.

5.5.2.1 *ISO 2709*

The [Format for Information Exchange \(ISO 2709\)](#) has been used by NBAs for many years to efficiently compress and exchange MARC data. While individual organisations may create MARC specific implementations of ISO 2709 (e.g. Library of Congress and [MARC 21](#)), all are fundamentally compliant with the core standard.

5.5.2.2 *MarcXchange*

[MarcXchange](#) specifies the requirements for a generalised XML-based exchange format for MARC records. This XML DTD describes a generalised structure, designed primarily for communication between systems using [MARCXML](#).

5.5.2.3 *METS*

The [Metadata Encoding and Transmission Schema \(METS\)](#) is a standard for encoding descriptive, administrative, and structural metadata regarding objects within a digital library, expressed using the XML schema language of the W3C. The standard is maintained by the METS Board in collaboration with the [Network Development and MARC Standards Office](#) of the Library of Congress and started as an initiative of the Digital Library Federation.

5.6 Standards and the semantic web

The [semantic web](#) is a vision of the web in which machines automatically process the content of information. The W3C publishes recommendations, which serve as standards for the semantic web.

Libraries are beginning to explore the possibilities for semantic enrichment and re-modelling of traditional bibliographic metadata via the use of linked data techniques to enable wider usage of resources. See [Chapter 6](#) for information on linked data services.

This section outlines some of the key standards NBAs should be aware of when developing semantic services.

5.6.1 RDF

[Resource Description Framework \(RDF\)](#) provides simple semantics for describing resources and the relationships between resources, on the web. Representations encoded in RDF are machine readable and can be exchanged between software applications and published on the web.

RDF enables the formulation of statements about web resources in the form of “triples”; that is, subject-predicate-object expressions (for example, “this chapter” “has creator” “Alan Danskin”). In RDF terms each component of this statement is a “resource”, which can be represented by a Uniform Resource Identifier (URI). The whole statement can therefore be expressed in terms that a machine can process.

5.6.2 OWL

[Web Ontology Language \(OWL\)](#) is designed to enable machine processing of the content of information. OWL explicitly represents the meaning of terms in vocabularies and the relationships between them.

5.6.3 SPARQL

[Simple Protocol and RDF Query Language \(SPARQL\)](#) is a query language for RDF-based databases commonly used in linked data initiatives.

5.6.4 Linked data in libraries

Agencies responsible for maintenance of bibliographic models and standards have recognised that alignment with these developing standards is essential if bibliographic standards are to have any relevance in the semantic web. A number of initiatives are therefore ongoing to define bibliographic standards in accordance with these recommendations.

IFLA maintains [namespaces](#) for its major bibliographic standards: ISBD, UNIMARC, LRM/FRBR, and MulDiCat.

The Library of Congress BIBFRAME initiative is also using an approach informed by linked data developments in the library community to create a successor to the MARC 21 format.

5.7 Character encoding standards

In a globalised world, it is essential to encode characters in a manner that can be interpreted internationally and to encode and present information in the script required by the user. In such an environment, it is not unusual to find multiple scripts present within a single bibliographic record even when transliteration is still required for indexing in a homogeneous script. Accurate character encoding is therefore essential for exchanging data internationally.

Inevitably, however, the more characters that need to be accurately described, the more complex the character encoding standard has to be.

5.7.1 ASCII and specialist character sets

For many years, basic Latin letters, numerals and symbols were encoded in [ASCII \(American Standard Code for Information Interchange\)](#), one of the first character coding in computer processing. This standard was introduced in 1963 and uses a 7-bit encoding. Since the very beginning of library automation, however, there was a requirement for more than the basic Latin character set to be coded in bibliographies. Because of this, many standards for character sets were developed during the 1970s, the most common being ISO 5426 (extended Latin).

While for printed bibliographies the main goal of a character encoding standard was to describe all needed printing characters, in an age of international data exchange it is essential that any encoding standard can be interpreted globally. Thus, an increasing need for international data exchange led to a standardised universal character set coding: Unicode.

5.7.2 Unicode/UTF-8

Unicode, developed by the ISO Working Group responsible for ISO/IEC 10646 (JTC 1/SC 2/WG 2) and the [Unicode Consortium](#), is a universal standard for coding multilingual text. The ISO 10646 standard was first published in October 2002 and was revised in December 2003.

The 2014 version describes more than 110,000 characters from 100 scripts in addition to various symbols.

The uniform encoding can be done in a composed and decomposed form, the latter meaning that special characters consist of basic letters together with relevant diacritical marks. For example, Umlauts will be issued as a basic letter and an appended “combining diaeresis” on the vowel (U+0308).

Unicode (or ISO 10646) has the advantage of encoding almost every script and avoiding the ambiguity generated by the complex use of escape sequences. It can be used in a 16-bit set

(UTF-16) or in an 8-bit set (UTF-8). The latter is increasingly used on the web for data exchange and is thus recommended as the best choice for bibliographic records and library data processing. The latest version of the [Unicode standard](#) is available on the web together with [character code charts by script](#).

Further useful resources are:

- [libUnicode-plus](#) (Creation and manipulation of Unicode tables)
- [Unicode Character Search](#) (search for characters by their Unicode names)
- <https://en.wikipedia.org/wiki/Unicode>.

6 Service delivery

6.1 Introduction

Many national bibliographic agencies have migrated from print and CD-ROM to online, web-based options for the delivery of national bibliographic services. The choice any NBA makes for service delivery is influenced by the level of automation present in its parent country, its preferred business model, and the availability of resources and technical expertise.

The [National Bibliographic Register](#) contains many examples of service delivery implementations.

While the [ICNBS](#) provides some guidance concerning the format and design of the national bibliography, these primarily focus upon on print publications rather than online products.

The online national bibliography is an important information resource for [various user groups in different contexts](#) and the interface should, ideally, enable the functionality required by each group, i.e.:

- End-users (including groups, corporate bodies etc. who use the national bibliography as an information source): to obtain information on authors and their publications, on topics, etc., to identify publications or authors.
- Collection development and publisher analysis: to analyse available publications (including awareness of future publications).
- Acquisition and booksellers: to select and order publications.
- Cataloguing: for copy cataloguing or cataloguing support.
- Re-use of records: downloading or exporting records into other databases and other computer applications (e.g. CERL, Index Translationum, library catalogues for retrospective conversion).
- Rights management: to track publications and identify authors.
- Computer software: federated searching, distributed searching, harvesting, etc.

6.2 Common requirements

6.2.1 Access points

Core access points:

- Author
- Title
- Publisher
- Date
- Language/country
- Genre/format
- Subject
- Identifier
- Target audience.

For author access points, searching on any form of author name should be supported (i.e. authorised form or variants). This requires implementation of name authority control in any system. For rights management the author role (relator code) is also essential.

6.2.2 Subject access

The web has enabled libraries to make their databases available to a vast and diverse audience. The situation is even more heterogeneous with portals and distributed/federated searching across different resources and services. However, the principles of subject access (as known and developed in libraries) can be applied to any of these situations. Subject access has been identified as important to the majority of intended user groups of national bibliographies and it is therefore essential to provide it efficiently. Difficulties in determining the precise proportion of subject searches are attributed to users regularly using uncontrolled keywords derived from the descriptive metadata to undertake their subject searches.

[Guidelines for subject access to national bibliographies](#) were prepared by a working group of IFLA's Classification and Indexing Section¹.

6.2.2.1 *Subject search strategies*

User search strategies are inevitably shaped by the ways information can be accessed; either searching for a known item where the author, title or other information is available or searching on a specific subject of interest. Users undertake such searches by:

- Browsing subject indexes
- Entering precise subject heading terms
- Browsing via subject classifications.

Subject access to online bibliographic databases is a complex process involving a number of components:

- The database application
- Languages used for subject analysis
- Local policy and practice
- User input and responses
- Hardware and software enabling users to interact with the system.

6.2.2.2 *Subject indexing and keyword access*

Information retrieval systems enabling retrieval via subject fall into three basic categories:

- The first one indexes works via the actual words used in the document and/or its title and/or its abstract and. uses uncontrolled or natural language.
- The second one uses controlled words to describe a work's subject.
- The third one uses a controlled notation (numbers, letters or combinations) to express subjects.

In controlled (or prescribed) indexing languages the precise terms used to describe subjects and the process by which such terms are assigned are managed by a professional member of library staff. The development of online catalogues has enabled the blending of the best of both

¹ As of 2016 the IFLA Subject Analysis and Access Section.

controlled and uncontrolled approaches (i.e., keyword access and full-text searching) allowing users to benefit from the best aspects of both.

A controlled indexing vocabulary based on an authority list aids indexing and searching (Olson and Boll, 2001). It also:

- Authorises a single term or notation for any one concept
- Establishes the size or scope of the term
- Explicitly records its hierarchical and affinitive or associative relations
- Controls variant spellings
- Explicitly identifies the multiple concepts expressed by homonyms, by means of adjectives, qualifiers, or phrases and precise terminology.

Use of such a vocabulary helps searchers focus their thoughts when approaching the system with an incomplete understanding of the information they require and increases the probability that:

- Both indexer and searcher will express a specific concept in the same way.
- Both indexer and searcher will be led to a desired topic by syndetic features (e.g. broader term, narrower term, related term).
- The same term will be used by different indexers thereby ensuring consistency of indexing.

The alternative approach of keyword and/or full text access enables users to utilise their own terminology and can provide better recall, particularly when augmented by the use of dictionaries, corpora, stemmers, parsers, etc.

The high input cost is often mentioned as the main disadvantage of controlled vocabularies. However, such systems can compensate for variation in language or subject term usage when resources are indexed for cross-disciplinary collections.

6.2.3 Functionality

Google and Amazon have changed user expectations and behaviour with regard to search functionality and have made large result sets and low precision commonplace. However, many new systems, e.g. those developed for electronic journals, offer highly developed, precise searching options. National bibliographies should offer a range of online features including:

- Simple keyword searching – although not sufficient for sophisticated users with specific information needs.
- Advanced searching options – e.g. searching within a particular access point and (implicit or explicit) use of Boolean operators. Provision of online search forms to structure user searches are the most intuitive option.
- Browsing of indexes – to enable the easier formulation of queries, indexes should be available for browsing and chosen values should be transferable to the user search statement.
- Faceted browsing on criteria such as genre, language, target audience.
- Searching on individual or corporate author names supplemented by name authority control.
- Authority control in online systems – enables and enhances the identifying and finding functions of the catalogue via the use of consistent forms for access points and access via

both authorised and variant forms. In an authority-controlled system, a user can safely assume all works relating to a specific name will be retrieved together.

Two important auxiliary functions are related to manipulation of results:

- Export of results is required when users wish to transfer bibliographic records into different computer applications for customised use (e.g. to compile a bibliography or reference list).
- Sorting is important for large result sets, which are not unusual for national bibliographies. Several sorting keys should be available, e.g. for manifestations:
 - Publication date (increasing and decreasing)
 - Author relationship
 - Publisher
 - Contexts.

6.2.4 Interoperability

National bibliographies, particularly electronic national bibliographies, should be designed to facilitate international aggregation. It is extremely important therefore to support interoperability to get fully functional databases with rich searching and browsing features.

6.2.4.1 *Standards use*

Most standards were created within professional communities aiming to ensure interoperability within those communities. This explains why library standards are not compatible with those used even in similar domains such as museums, archives, and publishing. Currently, there is movement toward using generic standards that are common to multiple communities. For NBAs, the issue has changed to one of selection from multiple pre-existing options of appropriate standards to meet specific requirements.

6.2.4.2 *Cataloguing rules*

Compatibility of formats complements compatibility of cataloguing rules, with formats covering structural issues and cataloguing rules governing record content. The 1961 Paris Principles made recommendations on the choice, form and structure of access points for names and for titles, and in 1969 the IFLA International Meeting of Cataloguing Experts (Chaplin, Anderson and Honoré, 1970) held in Copenhagen produced a resolution that proposed the creation of standards to normalise the form and content of bibliographic descriptions.

6.2.4.3 *Character encoding*

It is essential to be able to encode and present information in the script required by the user. In an increasingly global environment, it is not unusual to find multiple scripts present in a bibliographic record even when transliteration is required for indexing in a homogeneous script. Accurate character encoding is therefore essential for international data exchange.

Unicode (ISO 10646) has the advantage of embedding almost every script and avoiding ambiguity generated by the escape sequence solutions of earlier character sets. It can be used in a 16-bit set (UTF-16) or in an 8-bit set (UTF-8). The latter is recommended for bibliographic data exchange. Unicode is used increasingly in the web environment and is the best choice for bibliographic records and library data processing.

6.2.4.4 *Bibliographic metadata formats*

A bibliographic format describes the structure that enables cataloguing metadata to be processed by a computer. Numerous bibliographic formats exist both within and beyond the library environment e.g. MARC 21 and ONIX. However, the key issue for the NBA is that of metadata interoperability between libraries and users across both international boundaries and professional domains. Because of this, standard formats are highly recommended in opposition to local or proprietary options.

6.2.4.5 *Management of changes to metadata*

In addition to new records, any NBA with responsibility for distributing bibliographic data should also offer record updates and deletion. This is particularly important for NBAs supporting Cataloguing in publication (CIP) services where upgrades based on published works replace preliminary pre-publication records. Supply of deletions and amendments is also important where significant database modifications occur (e.g. to support changes to format or cataloguing rules).

- When changes are made to all records (e.g. due to record control numbers or format migration), NBAs should offer complete replacement data sets in order to eliminate any ongoing requirement to support multiple versions.
- Batches of record amendments and deletions should be offered regularly (e.g. weekly) in a standard form to enable those wishing to process them to implement any changes in an efficient and timely manner. It is common to include record amendments and deletions together with new records in a single file if the record exchange format (e.g. MARC ISO 2709) supports the clear coding of each record type. Should this not be the case (e.g. with some XML based formats), then separate files containing each record category should be provided and clearly labelled.

Changes to metadata within online bibliographic systems are not normally indicated, although an individual record's history may be determined to some extent via the use of a record field describing original provenance (e.g. CIP agency) and subsequent amendment (e.g. national library).

6.3 **Delivery options**

6.3.1 **Print and hybrid options**

Printed national bibliographies have historically been the norm and in certain circumstances can still deliver an effective service. Rising production and distribution costs have however led many NBAs to replace them. Print-analogue formats include PDF files issued on the web or static HTML pages that reflect the layout of traditional print bibliographies. These online options have the advantage of allowing user self-service. By eliminating distribution costs, these forms can readily be offered for free, while traditional print products may require cost-recovery. Rather like the bibliographies they replace, such print-analogue solutions normally include a relatively small selection of metadata (e.g. weekly or monthly issues) and cumulative databases are offered in parallel with more comprehensive search functionalities.

6.3.2 **Digital media**

The findings and recommendations of the European National Libraries Project on CD-ROM were widely used in the production of national bibliographies on CD-ROM. In general,

CD-ROM complemented rather than replaced the printed versions. Most countries that published their national bibliography on CD-ROM also offered the same data online, some as a separate database, others as a part of their national library catalogue.

CD-ROM delivered some specific benefits in terms of information retrieval and distribution of machine-readable data over other formats. However, currency was an issue and distribution costs were relatively high. CD-ROM was briefly popular during the 1990s, but is since largely superseded. Installing and networking CD-ROM databases to be shared by multiple staff members is onerous for libraries that might want to make use of the national bibliography metadata. The software developed to support national bibliographies on CD-ROM is showing its age when compared with contemporary web interfaces.

6.3.3 Online access

Online catalogues or specialised databases are the preferred means of offering access to a national bibliography. Online access enables data to be regularly updated and it can be available to users globally whenever required, without requiring the distribution infrastructure of a print or disc option. The ubiquity of web client applications together with standard protocols allows NBAs to concentrate their limited resources on core systems development while also offering the potential for additional services, e.g.:

- RSS feeds tailored to the user's personal profile
- Access to the full text of electronic resources (usually through the national library's digital library, and subject to rights)
- Premium or value-added services for monetising the data set.

6.3.4 Mobile options

In recent years, following the rise in popularity of smartphones, tablets and other mobile devices, new delivery options for web-based catalogues have developed. Broadly these options fall into three main categories:

- Traditional web-based catalogues which use a responsive design to adapt to different screen sizes.
- Separate mobile versions of web-based catalogues on which simplified compact versions of web pages have been created for access by phones or tablets.
- User-installed catalogue applications (apps) developed by library management system vendors or library information technology departments. These are often customised web clients optimised for use on smaller devices and potentially distributed via general app stores such as Google Play or iTunes.

As increasing numbers of users access the web via non-PC devices, their utility is increasing. NBAs wishing to offer mobile access should first investigate whether their library management system vendor can offer a suitable solution since this is likely to be the most cost-effective option in terms of both development and support costs. If this is not available, the system vendor may be able to offer details of their system's application programming interface (API) to enable the NBA to develop a custom application. However, this may involve the NBA committing significant ongoing resources to a regular development upgrade path due to the rapidly evolving nature of mobile communications.

6.4 Interfaces

The interfaces of national bibliographies share many properties of library online discovery systems and bibliographic databases in general. As librarians have embraced improving user experience (UX) in discovery systems, a body of research has developed in optimising systems.

For a good UX, interfaces should be simple, clear, and tolerant of mistakes. Google's popularity as a search tool has changed users' expectations of searching and for interfaces and made them less tolerant of complex systems. End-users do not want to use systems requiring lengthy training.

Systems designers are increasingly aware of the requirement to support browsing for users with unspecified or very general information needs. Navigation within large result sets is also improving, with faceted browsing in which results are arranged and presented by facets such as genre, form, language etc. UX also addresses the important topic of accessibility for users with visual disabilities. Increasingly, legal requirements exist to ensure accessibility for materials issued from educational or government bodies.

6.4.1 Search options

When they have specific information needs, users commonly express these in the form of a query or search statement and much research has concentrated on this area. Users may formulate queries in several ways, e.g. by:

- Using natural language
- Entering one or more search terms (keywords)
- Completing a search template
- Selecting search terms from menus offered
- Formulating logical statements (using Boolean logical operators to assemble queries).

The first two options share some common characteristics in that neither requires familiarity with specific database terminology. Although this can appear to make them more friendly, users may be misled into believing the system “understood” their search request. Despite this, simple keyword searching has become a de facto standard for a generation who use Google as their premier information resource. It should therefore be offered as a search option by any NBA targeting the general user population. However, since keyword searching typically results in low precision and large result sets, some relevance ranking mechanism should be implemented to improve likelihood that the most relevant results are presented first.

6.4.2 Query formulation

Search “command mode” was historically the first method of query input, and logical statements together with Boolean operators and extensions continue to be used in both commercial databases and library catalogues. Despite this, users often have problems with Boolean operators, such as conceptual problems with formulation, unranked result sets that are too large or small, and lack of weighting of results. Users accustomed to Google expect natural language searching and relevancy algorithms.

Because of this, several improvements have been made in many systems, e.g.:

- Result ranking
- Feedback
- Weighting of terms
- Proximity operators
- Faceted navigation to deal with large result sets.

Selection from lists of terms is often combined with either templates or logical statements. It enables users to select terms from indexes, dictionaries or controlled vocabularies and include them directly in the search statement.

6.4.3 Query building

The combination of search templates together with a forms-based interface is a user-friendly option which enables inexperienced users to rapidly construct sophisticated search strategies without training. When constructing templates, system designers constrain free-form user input via selection of common queries to be supported in advance. When a user enters terms into a form, they can be combined into a logical search statement in one of two main ways:

- Implicitly – via automatic use of Boolean AND operators between fields in the form
- Explicitly – where users select logical operators to be used between a form's fields via a menu.

The advantage of the latter option is increased flexibility; the disadvantages are the same as with logical statements in general.

6.4.4 Search results

A search query normally results in a set of records requiring examination in order to determine their relevance, and the system's interface should facilitate this function. Results must be listed clearly, should ideally be sorted according to expected relevance (i.e., compliance with the original query) and support relevance feedback. Common objectives for results presentation have been the subject of specialist research (Shneiderman, 1998):

- Consistency of data display (layout, formats, fonts, colours, terminology, etc.)
- Efficient information assimilation by the user (proper layout and spacing, comprehensive labels, etc.)
- Minimal memory load on user
- Compatibility of data display with data entry
- Flexibility for user control of data display (several display formats, sorting, etc.).

6.4.5 Display of results

Search results should enable users to evaluate their relevance as swiftly and easily as possible and inform their continuing search strategy. Typically, results are first listed in a summary display with a choice of formats available for more detailed display of individual records.

Minimal recommended requirements should include:

- Complete bibliographic/authority format (including display of all fields present in the record)
- Citation format ([ISO 690](#), [APA](#), MLA, etc.) with all information needed to identify a publication.

In addition, the following optional formats may be provided:

- Labelled user format
- ISBD style display.

Hyperlinks should be supported within records enabling direct navigation to related resources, like works of the same author, works on the same subject, etc.

A link to publisher websites can be useful for acquisition purposes, but this should be considered against the need for link maintenance.

FRBR and its successor IFLA LRM offers a more intuitive and meaningful clustering of large result sets. In addition to the creation of FRBR-based cataloguing rules to support these approaches, there have also been attempts to extract information about FRBR entities, their attributes and relationships from pre-existing data in a process commonly known as “FRBRisation”. FRBRisation experiments (Hegna and Murtomaa, 2002; Hickey, O’Neill and Toves, 2002) show the library community is aware of the need to change current practice. Due to their coverage and description level, national bibliographies offer a good starting point both for FRBRisation and original LRM cataloguing.

6.4.6 External linking from online catalogues

In recent years, libraries and NBAs have begun to examine ways in which traditional catalogues can be enhanced via linking bibliographic records to a variety of third-party resources. Options include:

- Commercial record enrichment services – including book jacket images, independent reviews, abstracts, etc. to assist the visual appeal of the catalogue and to contribute to identification and selection of resources
- Links to online bookshops or publisher websites – enabling the purchase of resources retrieved in a results set
- Linking to digital content – enabling direct access to retrieved resources
- Linking to external catalogue aggregations – enabling location of resources in the nearest library worldwide, e.g. OCLC WorldCat
- Linking to social media – enabling the sharing of results with fellow users.

6.4.7 Personalisation of online services

Traditional online systems have long offered users a degree of customisation (saved searches, preferred display or download formats, etc.). These are normally linked to a user’s login account and are not usually available to anonymous users. However, more recently a new range of options have arisen enabling increased personalisation of online services based on stored user preferences or search tracking. Inevitably, such options are more effective in proportion to the

amount of information volunteered by users. NBAs should therefore be familiar with data protection legislation in their countries and take appropriate measures.

Personalisation options can include:

- Creation of customised automated feeds (e.g. via [RSS](#)) of records for new publications (e.g. by selected authors, publishers or in a specified subject area)
- Storage of record result sets and search criteria – for regular re-use
- Creation of custom download sets from stored preferences – e.g. in PDF
- Storage of a user's institutional membership information – enabling access to remote lending or other added value services
- Storage of user payment data – enabling rapid purchase of additional services
- Storage of contact information – for personalised communication
- Storage of user preferences (record fields, number of records per page, formats, etc.) – for customised display and download
- Support of record annotation with personal notes for research.

6.4.8 Record and results save and download options

After a user has retrieved a satisfactory set of results from an online service, they may wish to save them for future reference or manipulation and use within other computer applications. NBAs should ensure that users are provided with suitable options enabling export of results in a variety of popular formats (MARC, ISBD, standard citation form, etc.). These could include:

- Direct printing of results for reference in different levels of detail (e.g. brief, detailed)
- Saving to a local file for reference or manipulation or online file set for cumulating with future search results
- Email of results to the user's preferred account
- Supply to online or local citation management systems (e.g. [EndNote](#), [RefWorks](#), [Zotero](#) or any [RIS](#)-compatible system).

6.5 System interfaces and search protocols

The requirement to offer access to online bibliographic databases via a user's local interface was identified some time ago and a number of different search and retrieval protocols have been developed for this purpose, built around the client/server model.

6.5.1 Z39.50

[American National Information Standards Organization Z39.50](#) is the most popular synchronous search and retrieval protocol used in the library world. It is based on a client/server architecture and supports MARC format structures. Most library management systems offer options for both a Z39.50 client and a server package linked to their library system infrastructure.

The [Z39.50 maintenance agency](#) is the Library of Congress, which also offers:

- A [list](#) of freeware and commercial products
- An [implementation register](#)
- A useful [glossary](#)
- Details of the [bibliographic attribute sets](#) supported by the standard

When implementing the protocol on a system, profiles must be defined and supported. The most popular and simple profile is the [Bath profile](#) and is available in English and French.

6.5.2 SRU/SRW

[Search/Retrieve via URL \(SRU\)](#) is a standard synchronous search protocol for internet search queries, utilising [Contextual Query Language \(CQL\)](#), a standard syntax for representing queries. [Search Retrieve Web Service \(SRW\)](#) is a companion protocol to SRU. The Library of Congress serves as the maintenance agency for these standards.

6.5.3 OAI-PMH

[Open Archive Initiative – Protocol for Metadata Harvesting \(OAI-PMH\)](#) is a client/server architecture protocol specification that facilitates the diffusion of metadata, e.g.:

- Resource description (title, author, date of publishing, publisher, etc.)
- Resource location on the internet (indicated by the URL).

The client sends a request to the server to which the response is an XML flow. The harvesting is done on non-qualified [Dublin Core](#) elements, to which additional elements (e.g. in MARC format) may optionally be attached.

OAI-PMH supports two key functions:

- **Metadata provision** – i.e., an institution exposes its metadata (bibliographic records in Dublin Core) via an OAI-PMH server to enable them to be harvested by other organisations or internet search engines.
- **Service provision** – i.e., an institution harvests metadata offered by OAI-PMH from other institutions integrating them into its own search index for use in its own user interface. The frequency of harvesting must correspond to the update frequency on the remote OAI server.

OAI-PMH is an asynchronous protocol, i.e. users do not search remote servers directly, but rather a local database that stores previously harvested metadata. Because of this, searching is faster even if a selected resource still needs to be retrieved from a remote server.

NBAs might choose to offer OAI-PMH to ensure their national bibliographies are available for indexing by general web search engines and thus can be accessed by users globally.

6.5.4 API access

One of the most flexible options for accessing a data set directly is via an [Application Programming Interface \(API\)](#). This allows third party developers to create unique or tailored [interfaces](#) to one or more systems enabling them to be cross searched by end users in a uniform manner. Such interfaces may vary from stand-alone applications to modules for large scale integrated library systems. Common protocols used to offer API access include [REST](#) and [SOAP](#).

In addition to any technical systems development work required, NBAs wishing to offer API access would need to offer potential developers current details of the API specification for their particular database, e.g. the [OCLC WorldCat Search API](#). NBAs should also ensure that they

take account of any potential security implications arising from granting access to their data sets to third parties.

6.6 Bulk data files

While few NBAs currently use physical media (tape, disc, etc.) to regularly disseminate files of bibliographic metadata, most offer some form of online file transfer service (e.g. via [FTP](#)). In addition to the use of dedicated FTP servers requiring a user account and login, NBAs may also make use of the fact that web browsers also have built-in file transfer capabilities and offer direct access to data files from their national bibliography web pages.

NBAs offering bulk data should ensure that they:

- Provide a regular schedule for when new data is to be made available.
- Accompany all data files with a text file describing the contents of the file (or set of files) together with basic statistical information (file size in bytes, numbers of new records, changes, deletions, etc.).
- Uniquely name and number the data and accompanying text files in a concise, logical and easily understood manner so users can automate the file downloads if required.
- Regularly maintain the download site (e.g. removing old or outdated files after a suitable period).
- Arrange files for retrieval in a coherent, secure and consistent way to allow the rapid navigation of the download site by users.
- Offer some form of technical support for the service.

6.6.1 Regular supply of files

File transfer services are commonly used to offer regular (e.g. weekly, monthly, annual) bulk data files that include all records that have been added, changed or deleted in the national bibliography. In the past, such files have traditionally been offered in the MARC format (or formats) supported by the NBA. However, data may also be made available in XML-based formats, including [MARCXML](#) and [MODS](#).

Regular MARC files offer a convenient option for customers wishing to load metadata from the national bibliography into their library management systems due to the fact that most system providers offer a MARC load interface as a standard feature.

6.6.2 Other uses

In addition to regular updates, bulk data files may also be provided to:

- Customers wishing to undertake an offline retrospective conversion of their catalogue and requiring a complete back file of the national bibliography.
- Offer customers a complete refresh of the data set following a significant change (MARC format, adoption of new cataloguing rules, significant change to identifiers, etc.).
- Offer complete data sets in an alternative format to non-library users (in [Dublin Core](#), [RDF](#), “flat file”, etc.) as part of an [open data](#) initiative.

6.7 Security issues

NBAs offering services to individual or institutional users should be aware of the potential data and system security issues faced by any organisation offering online access. It is outside of the scope of this document to offer detailed information on this topic but security threats fall into two broad categories: system integrity threats and risks to user data. NBAs should take measures (anti-virus protection, secure firewalls, regular password changes, etc.) to ensure that their systems and services reduce security risks to a minimum. In addition, NBAs should undertake regular audits to ensure their security measures remain adequate.

6.7.1 System security

Threats to system security involve the hacking of online systems by malicious individuals or groups. Threats fall into three main areas:

- “Denial of Service” attacks in which online systems are overwhelmed by additional network traffic targeted by hackers.
- Infiltration of online systems by third parties for the purposes of disruption, damage or theft of information.
- Disruption from viruses or malware that may inadvertently be passed on to/from third parties (Note: Local legislation may make NBAs financially liable for passing on viruses etc. It is therefore important to ensure appropriate measures are in place to minimise this risk).

6.7.2 Personal data

All organisations holding customer or user data (addresses, payment details, passwords, etc.) must be aware of their responsibilities for ensuring it is not misused or stolen. NBAs holding such data should take account of the relevant local data protection legislation in their countries (e.g. the European Union’s [General Data Protection Regulation](#)) when designing and operating online services in order to comply with accepted best practice.

6.8 Linked open data (LOD)

Another option for NBAs wishing to disseminate national bibliographic information has been the creation of free linked data of their data sets. Such services normally form part of an NBA’s wider [open data](#) initiative, e.g. the [Linked Open British National Bibliography](#). The final report of the [W3C Library Linked Data Incubator Group](#) contains much useful background information.

6.8.1 Linked data for libraries

While traditional library metadata is based on a proprietary, document-based model, linked data uses a dynamic data-based model based on linking simple three-part [RDF](#) statements (“triples”) describing resources (books, persons, corporate bodies, places, etc.). The subject and the predicate of the triple statement must be URIs (or IRI) but the object can either be a literal value or a [URI/IRI](#).

Therefore, a move to linked data is one from self-contained “document style” bibliographic records describing published resources to one in which simple statements about resources (e.g. [This book] [has the author] [Charles Dickens]) are created with “records” flexibly assembled from selected statements as required by linking those statements sharing common properties.

Linked open data services are based on the use of large-scale sets of RDF triple statements (“triple stores”) which can be queried using the [SPARQL](#) standard and made accessible via a linked data [API](#). Results can be delivered in a number of formats (e.g. [JSON](#), [Turtle](#) or [RDF](#)).

6.8.2 Context of LOD services

In order to make metadata available to the wider community and stimulate the wider re-use of bibliographic metadata, a number of NBAs offer a range of open data and linked data services. A number of factors have converged to encourage library experimentation in this area:

- The web has accelerated development of a collaboration culture and fostered expectations that information and content should be as freely available as the internet itself.
- Library metadata has gained new value from open technologies facilitating its connection and reuse in contexts outside of the traditional library domain.
- Due to the nature of their funding, national libraries may have to comply with government open data regulations for public organisations, promoting transparency, economic growth and innovation.
- While library users were once lone scholars they may now include: collaborative learners, data miners and even machines automatically harvesting metadata for search engines.

6.8.3 Benefits of LOD

Although the learning curve for linked data technologies can be steep, a number of benefits have been suggested for libraries and NBAs, including:

- New opportunities for leadership as their recognised authority, persistence and stability are seen as highly desirable when building a future global information infrastructure.
- Lower barriers for re-using library metadata increases its wider community value and improves access to information and culture.
- Improved web integration of resources increases visibility and reaches new users.
- An accessible open global pool of reusable metadata will reduce duplicated effort and enable organisations to concentrate on adding unique value.
- New perspectives, skills and contacts from collaborating with developers and users on cross-domain projects.

6.8.4 Challenges arising

While the possible benefits for NBAs wishing to offer linked open data services are significant, the challenges should not be underestimated. These include:

- The financial impact on revenue from more traditional metadata services
- Complex copyright and licensing frameworks impacting on the ability to offer consistent service
- Confusion arising from differing interpretations of the terms “free” and “open” by user communities
- The requirement to remodel traditional library data in a new linked data environment
- The need for sustainability and persistence of linked data resources
- The steep learning curve for library staff used to more traditional formats
- Choice of sites to link data to
- Creation of persistent identifiers for data elements.

Fortunately, the use of linked data in libraries has become more common and is evolving from an experimental to a standard operational activity, and an increasing number of libraries are gaining expertise in the area. The [IFLA 2014 satellite meeting Linked Data in Libraries: Let's make it happen!](#) included a range of presentations on different aspects of linked data activity from library organisations.

6.8.5 Licensing options

Several licensing options for public domain content and metadata have been developed by organisations such as [Creative Commons](#), offering originators credit and some liability protection. However, few organisations give unconditional access to all their metadata in perpetuity, and they usually carefully define their free offerings. Due to their emphasis on ease of re-use, many linked data services use the highly permissive [Creative Commons Zero \(CC0\)](#) licensing.

6.9 Persistent identifiers

As national bibliographies are going more and more online, the issue of permanent identifiers for citation and linking is becoming crucial at the international level.

[Persistent identifiers](#) are identifiers that can be cited to retrieve digital objects over a long period of time.

Examples of persistent identifier systems include:

- [Archival Resource Keys](#) (ARKs)
- [Digital Object Identifiers](#) (DOIs)
- [Persistent Uniform Resource Locators](#) (PURLs)
- [Uniform Resource Names](#) (URNs).

6.10 User support and communications

An important element for NBAs to consider when developing and implementing bibliographic services is how to communicate effectively with users. Communication can take a variety of forms, including: system specific user support, service development or maintenance and subscription or account queries. In each case, NBAs have a number of options available from telephone and email to social media and online help facilities.

This section outlines a number of the issues NBAs should take into consideration when developing a user communication strategy.

6.10.1 Online help options

Information retrieval systems should ideally be designed in a way to enable the end-user to use them without outside assistance, special documentation or training. However, regardless of the type of interface adopted, users inevitably require some form of help system when working with an online system or catalogue. Error and other system messages should also be considered to be a part of online help and terminology, acronyms, etc. should be consistent throughout the system.

The most common forms of online help are:

- Online tutorial
- Online manual
- Context-sensitive help
- Online guidance.

It is common for online systems to include several of these options.

Online help should be:

- Available at all times
- Well-constructed and should reveal its structure to the user
- Well-presented
- Well-written and use friendly language
- Accommodate more than one user level
- Easy both to enter and exit.

6.10.2 Help desks

NBAs should endeavour to offer some form of help desk support within advertised hours for user queries that cannot be resolved via online help or FAQs. Help desks should be operated by staff highly experienced in technical aspects of the system supported and in dealing with a wide range of user enquiries. Help desk support is commonly offered by some combination of telephone and email service with the latter often being used to capture enquires made outside of designated support hours. Live online support via chat is another mode of delivery.

6.10.3 Service communications

It is good practice to make announcements relating to service changes, down time or upgrades to system users via all available channels. This could include:

- Notices on the system home page
- Twitter or other social media feeds
- System web pages
- Email to registered users.

7 Glossary

[AACR2](#) - Anglo-American Cataloguing Rules, 2nd edition. It was the cataloguing standard used throughout the UK, Australia, Canada, and the USA. It was also adopted in full or in part by 56 other countries around the world. It has been replaced by [RDA](#), Resource Description and Access.

[AAP](#) - Association of American Publishers

Access point control, see **Authority control**

Anglo-American Cataloguing Rules, 2nd edition, see **AACR2**

[ANSI](#) - American National Standards Institute

[APA](#) - American Psychological Association

[API](#) - Application programming interface

[ARK](#) - Archival Resource Key. ARK is a Uniform Resource Locator that is a multi-purpose identifier for information objects of any type

[ASCII](#) - American Standard Code for Information Interchange

Authority control - Authority control (or access point control) refers to the normalisation of controlled access points (headings) and the provision of alternative and related access points. Authority control: supports the find function through the collocation of works by a given author or the collocation of anonymous works by title; supports the identify function via the disambiguation of names of persons, corporate bodies or titles of works and expressions; is also used to identify and relate resources by subject. Authority control is a process that organizes bibliographic information in library catalogs by using a single, distinct spelling of a name (access point or heading) or a subject for each topic. (Glossary of Library and Information Science)

[BDS](#) - Bibliographic Data Services Limited

[BIBFRAME](#) - Bibliographic Framework initiative of the Library of Congress

Bibliographic control - A broad term encompassing all the activities involved in creating, organizing, managing, and maintaining the file of bibliographic records representing the items held in a library or archival collection, or the sources listed in an index or database, to facilitate access to the information contained in them. Bibliographic control includes the standardization of bibliographic description and subject access by means of uniform catalogue code, classification systems, name authorities, and preferred headings; the creation and maintenance of catalogues, union lists, and finding aids; and the provision of physical access to the items in the collection. (Reitz, 2004, p. 69)

Bibliographic record - A set of data elements that describes and provides access to a bibliographic resource and identifies related works and expressions. (MulDiCat)

Bibliographic resource, see **Resource**

BIC - Book Industry Communication

BNB - British National Bibliography

BnF - Bibliothèque nationale de France (French National Library)

Book trade - The operations and arrangements that exist in a specific country for the manufacture, distribution, and sale of books to the public, including publishers and their associations, printers and binders, retail booksellers and their trade associations, jobbers and dealers, and the generally accepted practices, standards, and codes governing their activities. (Reitz, 2004, p. 97)

Cataloguing (cataloging) - The process of creating and maintaining bibliographic and authority records of the library catalog, the database of books, serials, sound recordings, moving images, cartographic materials, computer files, e-resources, etc. that are owned by a library. (Glossary of Library and Information Science)

Cataloguing in publication (CIP) - CIP was pioneered in the [U.S. Library of Congress](#) in 1971. The [British programme](#), which closely resembles the US system, became fully operational in 1977. The aim of the programme is to provide bibliographic data for new books in advance of publication, and it depends heavily on the voluntary co-operation of publishers. Records are compiled from information supplied by publishers on a standard data sheet. The record also appears in the book itself, usually on the verso of the title-page. (Prytherch, 2005, p. 115)

CC0 - Creative Commons zero. This license signifies “no rights reserved” and waives all rights allowing the works to be placed in the public domain.

CDL - California Digital Library

CDNL - Conference of Directors of National Libraries

CD-ROM - Compact Disk Read Only Memory

CERL - Consortium of European Research Libraries

CIDOC - ICOM International Committee for Documentation

CIDOC CRM - CIDOC Conceptual Reference Model

CNRI - Corporation for National Research Initiatives

Copyright - The exclusive right given by law to authors, composers or publishers to sell, reproduce or publish a work during a stated period of time. It is a form of protection for works, such as novels and journal articles, which result from the skill and labour of a creator, and for other subject matter which results from the investment of a producer, such as a film. (Mortimer, 2001, p. 50)

CQL - Contextual Query Language

CRM, see **CIDOC CRM**

CSV - Comma-Separated Values file format

DC - Dublin Core

DCMI - Dublin Core Metadata Initiative

DCMI Element Set - The Dublin Core metadata element set is a standard for cross-domain information resource description. It provides a simple and standardised set of conventions for describing things online in ways that make them easier to find. Dublin Core is widely used to describe digital materials such as video, sound, image, text, and composite media like web pages. Implementations of Dublin Core typically make use of XML and are Resource Description Framework based. Dublin Core is defined by ISO in 2003 ISO Standard 15836, and NISO Standard Z39.85-2007. The more comprehensive document “[DCMI Metadata terms](#)” includes the latest and authoritative term declarations for the Dublin Core Metadata Element Set, Version 1.1.

DCMI Metadata Terms - The authoritative specification of all metadata terms maintained by the Dublin Core Metadata Initiative - elements, element refinements, encoding schemes, and vocabulary terms (the DCMI Type Vocabulary).

DCMI Type Vocabulary - The DCMI Type Vocabulary provides a general, cross-domain list of approved terms that may be used as values for the Resource Type element to identify the genre of a resource. The terms documented here are also included in the more comprehensive document “[DCMI Metadata Terms](#)”.

DDC - Dewey Decimal Classification. General library classification system devised by Melvil Dewey in the 1870s, first published in 1876, and owned by OCLC since 1988.

Digital publication, see **Electronic publication**

DOI - Digital Object Identifier

DTD - Document Type Definition

Dublin Core Metadata Initiative, see **DCMI**

Dublin Core Metadata Element Set, see **DCMI Element Set**

Dublin Core Metadata Terms, see **DCMI Metadata Terms**

Dublin Core Type Vocabulary, see **DCMI Type Vocabulary**

DVD - Digital Video Disc

E-publication, see **Electronic publication**

EDItEUR - International group coordinating development of the standards infrastructure for electronic commerce in the book, e-book and serials sectors.

Electronic publication - A work in digital form capable of being read or otherwise perceived, distributed to the general public electronically. The category includes electronic journals and e-prints, electronic magazines and newspapers, electronic books, websites, weblogs, etc. Some electronic publications are online versions of print publications; others are “born digital”.
Synonymous with e-publication. (Reitz, 2004, p. 244)

FRAD - Functional Requirements for Authority Data. Conceptual model serves as the basis for relating specific attributes and relationships (reflected in the record as discrete data elements) to the various tasks that users perform when consulting authority records. Subsumed by IFLA LRM.

FRANAR - Functional Requirements and Numbering of Authority Records. IFLA Working Group that produced the FRAD conceptual model.

FRBR - Functional Requirements for Bibliographic Records. Conceptual model serves as the basis for relating specific attributes and relationships (reflected in the record as discrete data elements) to the various tasks that users perform when consulting bibliographic records. Subsumed by IFLA LRM.

FRBRoo - Functional Requirements for Bibliographic Records – Object-Oriented

FRSAD - Functional Requirements for Subject Authority Data. Subsumed by IFLA LRM.

FTP - File Transfer Protocol

Functional Requirements and Numbering of Authority Records, see **FRANAR**

Functional Requirements for Authority Data, see **FRAD**

Functional Requirements for Bibliographic Records, see **FRBR**

Functional Requirements for Subject Authority Data, see **FRSAD**

GARR - Guidelines for Authority Records and References

GND - Integrated Authority File. Cooperatively managed by the German National Library and library networks of the German-speaking countries. It contains data records representing persons, corporate bodies, congresses, geographic entities, topics and works. Before April 2012, those records were part of the separate authority files: Corporate Body Authority File (GKD), Name Authority File (PND), Subject Headings Authority File (SWD) and Uniform Title File of the Deutsches Musikarchiv (DMA-EST file).

HTML - HyperText Markup Language. A format of a markup language that controls the display of web pages i.e. font size, type, background and text colours.

HTTP - HyperText Transfer Protocol

ICA - International Council on Archives

ICABS - IFLA-CDNL Alliance for Bibliographic Standards. Established in 2003 by the National Library of Australia, the Library of Congress, the British Library, the Koninklijke Bibliotheek,

and the Deutsche Nationalbibliothek with the Biblioteca Nacional de Portugal, IFLA and CDNL to assure ongoing coordination, communication and support for key activities in the areas of bibliographic and resource control for all types of resources and related format and protocol standards. ICABS was superseded by ICADS.

ICADS - IFLA-CDNL Alliance for Digital Strategies. ICADS was established in August 2008 as a successor to ICABS. The new framework was renamed ICADS to reflect the increased concentration on digital library development and management. In December 2011, the ICADS Advisory Board decided to close ICADS and cease its activities.

ICNBS - International Conference on National Bibliographic Services held in Copenhagen on 25-27 November 1998. Organised by IFLA, with the Danish Royal Library, the Royal School of Library and Information Sciences and the Danish Library Centre.

ICOM - International Council of Museums

ICP - Statement of International Cataloguing Principles. This document provides the framework to reach the original goals of IFLA to increase the sharing of bibliographic information across communities, languages, and scripts.

Identifier - A number, code, word, phrase, logo, device, etc., that is associated with an entity, and serves to differentiate that entity from other entities within the domain in which the identifier is assigned. (MulDiCat)

IEC - International Electrotechnical Commission

IFLA - The International Federation of Library Associations and Institutions

IFLA. Bibliography Section - This IFLA Section is the international group interested in the techniques for the identification of content, arrangement, production, dissemination, and preservation of bibliographic information in national bibliographies, in particular through national bibliographic services in all contexts.

National bibliographic services are often interrelated with legal deposit, ISBN/ISSN assignment, cataloguing-in-publication, national authority files, and similar services. The Bibliography Section collaborates with related Sections, in particular, National Libraries, Cataloguing, and Subject Analysis and Access.

IFLA. Cataloguing Section - The Cataloguing Section proposes and develops cataloguing rules and principles, vocabularies, guidelines, tools and standards for bibliographic information, taking into account the development of electronic and networked digital environments to promote universal access to, and the exchange of, bibliographic and authority information. It also monitors relevant and innovative approaches in or related to cataloguing, namely linked data capabilities, cooperative creation of metadata, new professional skills or metadata reutilisation.

IFLA. Subject Access and Analysis Section - This Section focuses on knowledge organization systems (KOS) representing subject domains used in bibliographic description to provide subject access to bibliographic resources. The Section serves as a forum for creators of KOS, creators of bibliographic data and subject metadata, indexing and retrieval system designers, terminology services, and scholars and information professionals working in the area of subject representation, analysis, and access.

[IFLA LRM](#) - IFLA Library Reference Model. Conceptual model for bibliographic information which superseded FRBR, FRAD, and FRSAD.

[IME ICC](#) - IFLA Meetings of Experts on an International Cataloguing Code (2003-2007)

Interoperability - The ability of two or more systems or components to exchange information and to use the information that has been exchanged. (ISO 25964-2:2013)

[IRI](#) - Internationalised Resource Identifier

[ISAAR\(CPF\)](#) - International Standard Archival Authority Record for Corporate Bodies, Persons and Families

[ISAD\(G\)](#) - General International Standard Archival Description

[ISAN](#) - International Standard Audiovisual Number

ISBD - [International Standard Bibliographic Description](#) specifies the requirements for description and identification of information resources, assigns an order to the elements of the description, and specifies a system of punctuation for the description. Responsibility for the development and maintenance of ISBD resides with the [International Federation of Library Associations and Institutions – International Standard Bibliographic Description \(ISBD\) Review Group](#).

[ISBN](#) - International Standard Book Number

[ISMN](#) - International Standard Music Number

[ISNI](#) - International Standard Name Identifier

[ISO](#) - International Organization for Standardization

[ISRC](#) - International Standard Recording Code

[ISSN](#) - International Standard Serial Number

[ISWC](#) - International Standard Musical Work Code

[JSON](#) - JavaScript Object Notation

[LC/NACO Authority File](#) - International name authority file maintained by U.S. Library of Congress composed of authority data contributed by LC and member institutions of the Program for Cooperative Cataloging.

[LCC](#) - Library of Congress Classification.

[LCCN](#) - Library of Congress Control Number

[LCSH](#) - Library of Congress Subject Headings

Legal deposit - Legal deposit is a statutory obligation imposed on publishers, distributors and, in some countries, printers to give copies of publications to the national collection.

LOD - Linked Open Data

LRM, see **IFLA LRM**

LRMoo - IFLA Library Reference Model – Object-Oriented

MADS - Metadata Authority Description Schema. The Library of Congress' Network Development and MARC Standards Office, with interested experts, developed the Metadata Authority Description Schema (MADS), an XML schema for an authority element set that may be used to provide metadata about agents (people, organizations), events, and terms (topics, geographic, genres, etc.). MADS was created to serve as a companion to the Metadata Object Description Schema (MODS). As such, MADS has a relationship to the MARC 21 Authority format, as MODS has to MARC 21 Bibliographic - both carry selected data from MARC 21. MADS is expressed using the [XML schema language](#) of the [World Wide Web Consortium](#). The standard is developed and maintained by the [Network Development and MARC Standards Office](#) of the Library of Congress with input from users.

MARC - Machine Readable Cataloging. Standard for the representation and exchange of data in machine-readable form. The structure of MARC records is an implementation of national and international standards, e.g. Information Interchange Format (ANSI/NISO Z39.2) and Format for Information Exchange (ISO 2709).

MARC 21 - Standard for the representation and exchange of data in machine-readable form. The structure of MARC records is an implementation of national and international standards, e.g. Information Interchange Format (ANSI/NISO Z39.2) and Format for Information Exchange (ISO 2709). The MARC 21 formats are published by the Network Development and MARC Standards Office, Library of Congress. Changes to the MARC 21 formats are based upon proposals and discussion papers submitted by any user of the formats. All proposals are considered by the [MARC Advisory Committee \(MAC\)](#) and then ratified by the MARC Steering Group which is composed of the Library of Congress, Library and Archives Canada, the British Library and the Deutsche Nationalbibliothek. [The Canadian Committee on Metadata Exchange \(CCM\)](#), the Book Industry Communication (BIC) [Library Metadata Group](#), and [the Fachgruppe Datenformate](#) (German Committee on MARC) serve as national advisory committees for their respective members of the MARC Steering Group.

Metadata - Literally “data about data”. Structured information describing information resources/objects for a variety of purposes. (Reitz, 2004-2014)

METS - Metadata Encoding and Transmission Schema

MLA - Modern Language Association

MODS - Metadata Object Description Schema. The Library of Congress' Network Development and MARC Standards Office, with interested experts, has developed a schema for a bibliographic element set that may be used for a variety of purposes, and particularly for library applications. As an XML schema, MODS is intended to be able to carry selected data from existing MARC 21 records as well as to enable the creation of original resource description records. It includes a subset of MARC fields and uses language-based tags rather than numeric

ones, in some cases regrouping elements from the MARC 21 bibliographic format. MODS is expressed using the [XML schema language](#) of the [World Wide Web Consortium](#). The standard is maintained by the [Network Development and MARC Standards Office](#) of the Library of Congress with input from users.

[MulDiCat](#) - Multilingual Dictionary of Cataloguing Terms and Concepts

[NACO](#) - Name Authority Cooperative Program. The name authority component of the Program for Cooperative Cataloging.

NACO Authority File, see **LC/NACO Authority File**

National bibliography - National bibliography in the modern sense of the word is defined as a cumulation of the authoritative and comprehensive records of the national output (i.e., products of the national publishing industry) of a country, published regularly, and with the least possible delay. It is produced in accordance with international standards by the national bibliographic agency. Publication details and authorship are investigated and verified in detail.

National bibliographic agency (NBA) - The organisational unit established within a country's library system, which undertakes responsibility for the preparation of the authoritative and comprehensive bibliographic records for each new publication issued in the country, making the records in accordance with accepted international bibliographic standards and publishing them with the shortest possible delay in a national bibliography, which appears on regular basis. (International Federation of Library Associations, IFLA International Office for UBC and UNESCO, 1979, p. 7)

National bibliographic control - The activities to discover, identify and record all the publications produced in a country in order to build up the national library and archival collections, satisfy the information needs of the nation, and contribute to the development of an integrated library, documentation and archival infrastructure. (International Federation of Library Associations, IFLA International Office for UBC and UNESCO, 1979, p. 2)

National imprint - The product of the national publishing industry.

National output - All documents published in a country regardless of format (carrier), e.g. printed, audio-visual or electronic.

NBA, see **National bibliographic agency**

NBN - National Bibliography Number

[NISO](#) - National Information Standards Organization (USA)

[OAI](#) - Open Archives Initiative

[OAI-PMH](#) - Open Archives Initiative Protocol for Metadata Harvesting. A protocol specification that enhances the description of resources (digital but also non-digital) on the web. It does allow exchange and diffusion of metadata but not of digital object.

[OCLC](#) - Formerly known as Online Computer Library Center, OCLC is a global, cooperative library organization. Among its products are WorldCat and the Dewey Decimal Classification.

ONIX - Online Information Exchange

OWL - Web Ontology Language

PCC - Program for Cooperative Cataloging

PDF - Portable Document Format

Persistent identifier - A persistent identifier is a code that identifies a digital resource (document, object or bibliographic record) without any ambiguity and that can be cited for information retrieval in the long term. Even if the resource moves within the information system, the persistent identifier still remains the same thanks to a resolver system making a permanent correspondence between the identifier publicly known and the physical current address in the system.

PREMIS - Preservation Metadata Implementation Strategies

PRESSoo - A formal ontology intended to capture and represent the underlying semantics of bibliographic information about continuing resources, and more specifically about periodicals (journals, newspapers, magazines, etc.). PRESSoo is an extension of FRBRoo, which in turn is an extension of CIDOC CRM. The name is not an acronym but is intended to evoke “the press”.

Publisher - A person or corporate entity that prepares and issues printed materials for public sale or distribution, normally on the basis of a legal contract in which the publisher is granted certain exclusive rights in exchange for assuming the financial risk of publication and agreeing to compensate the author, usually with a share of the profits. (Reitz, 2004, p. 579)

PUC - Permanent UNIMARC Committee (IFLA)

PURL - Persistent Uniform Resource Locator

RAMEAU - Répertoire d'autorité-matière encyclopédique et alphabétique unifié

RDA - Resource Description and Access. RDA is the successor to AACR2 (Anglo-American Cataloguing Rules, 2nd edition).

RDF - Resource Description Framework

Resource - An entity, tangible or intangible, that comprises intellectual and/or artistic content and is conceived, produced and/or issued as a unit, forming the basis of a single bibliographic description. Resources include text, music, still and moving images, graphics, maps, sound recordings and video recordings, electronic data or programs, including those issued serially. (ISBD 2011, p. 338)

Resource Description and Access, see **RDA**

RIS - A standardised tag format developed by Research Information Systems to enable citation programs to exchange data.

[**RSC**](#) - RDA Steering Committee. Responsible for maintaining *RDA: Resource Description and Access*.

[**RSS**](#) - Really Simple Syndication or RDF Site Summary. A web feed that allows users and applications to access updates to websites in a standardised, computer-readable format

[**RVM**](#) - Répertoire de vedettes-matière de l'Université Laval. The Canadian French-language subject standard.

[**SACO**](#) - Subject Authority Cooperative Program. Established to provide a means for libraries to submit subject headings and classification numbers to the Library of Congress via the Program for Cooperative Cataloging (PCC).

SGML - Standard Generalized Markup Language

[**SNL**](#) - Swiss National Library

[**SPARQL**](#) - Simple Protocol and RDF Query Language

[**SRU**](#) - Search/Retrieve via URL. A standard search protocol for internet search queries, utilising CQL (Common Query Language) which is a standard query syntax for representing queries.

[**SRW**](#) - Search/Retrieve Web Service, a protocol bringing together Z39.50 experience with developments in web technologies to integrate access to various networked resources, and to promote interoperability between distributed databases.

Standards - Any code of rules or procedures established by national and international library organizations to govern bibliographic control, such as the MARC record format, CIP, and the ISBN/ISSN adopted by the publishing industry. (Reitz, 2004, p. 680)

Standard numbers, see **Identifier**

Statement of International Cataloguing Principles, see **ICP**

[**Turtle**](#) - Terse RDF Triple Language

[**UBC**](#) - Universal Bibliographic Control

[**UBCIM**](#) - Universal Bibliographic Control and International MARC. The Universal Bibliographic Control (UBC) programme was set up in 1974 by IFLA to encourage international conformity in the exchange of bibliographic data. The international MARC Programme was amalgamated with UBC in 1986 to form UBCIM. It was closed in 2003. The UNIMARC format, one of the major projects of UBCIM, is now the responsibility of the Permanent UNIMARC Committee (PUC) of IFLA.

[**UDC**](#) - Universal Decimal Classification. Adapted by Paul Otlet and Henri La Fontaine from the Dewey Decimal Classification, and first published (in French) from 1904 to 1907. It is maintained by the [**UDC Consortium**](#).

[**UNESCO**](#) - United Nations Educational Scientific and Cultural Organization

[UNICODE](#) - Comprehensive computer character encoding scheme, equivalent to the Universal coded character set (UCS) (ISO/IEC 10646) and maintained by the Unicode Consortium.

[UNIMARC](#) - Universal MARC. Standard for the representation and exchange of data in machine-readable form. Maintenance and update of UNIMARC, a set of four formats - Bibliographic, Authorities, Classification and Holdings - is the responsibility of the IFLA Permanent UNIMARC Committee (PUC).

URI - Uniform Resource Identifier

URL - Uniform Resource Locator

URN - Universal Resource Name

[USEMARCON Plus](#) - The Universal MARC Record Converter. USEMARCON is a software application that allows users to convert bibliographic records from one MARC format to another.

UTF - Unicode Transformation Format. UTF-8 (8-bits) and UTF-16 (16-bits) are commonly used.

[VIAF](#) - Virtual International Authority File. A collaborative effort which brings together authority files from national libraries and other organizations so that authority data for a given entity is linked together into a “super” authority record.

Voluntary deposit - Voluntary deposit is an agreement by which publishers commit to deposit material with the national bibliographic agency.

[W3C](#) - World Wide Web Consortium

[WIPO](#) - World Intellectual Property Organization

XML - eXtensible Markup Language

[Z39.50](#) - A client server protocol for searching and retrieving information from remote computer databases. It is covered by ANSI/NISO standard Z39.50, and ISO standard 23950:1998 (confirmed in 2020). The standard’s maintenance agency is the Library of Congress.

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