# A Proposal to The Andrew W. Mellon Foundation for:

***A Study to Determine the Needs and Requirements for Extending the Usability of the New Bibliographic Framework into the Global Networked Information Environment***

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## I. Proposal Summary

This proposal seeks a Director’s Grant for the purpose of conducting a study to determine the needs and requirements of the library, higher education, and non-profit networked information communities to ensure they are able to use and exchange bibliographic data in an increasingly networked, linked data environment.

The study will be developed using one face-to-face meeting in the United States and four global webinars, accompanied by workgroup efforts during the periods between webinars. These meetings will be conducted to coordinate the needs and requirements of key communities (including libraries, technologists such as the World Wide Web Consortium (W3C) and the Dublin Core Metadata Initiative (DCMI), and library system providers, as well as other international standards development organizations). Specifically, the report will identify exchange points where standards development is needed and will document suggested points where functionality testing should be performed so that feedback can be provided to all participants in linked-data bibliographic exchange.

This project will also serve as a coordination mechanism for the identified communities to ensure that those seeking to cite and use library resources on the Web will be able to do so using data contained in the New Bibliographic Framework.

## II. Proposal Narrative

### **II.a. Background**

The bibliographic exchange environment in which the majority of the world’s libraries operate has been based on the Machine Readable Cataloging (MARC) standard since it was developed in the late1960s. Henriette Avram, a talented computer programmer and systems analyst before joining the Library of Congress, developed MARC during her tenure there. Computational power, functionality of network information systems, and the records processes utilizing MARC have risen exponentially since the standard was developed. Despite some changes to the specification over the years, no fundamental shift in how bibliographic information is created, stored, and exchanged has occurred for over 40 years. Given the pace of computer technology advances, experts consider an update long overdue. Roy Tennant, a well-known technologist focused on library automation technology and now working at OCLC (Online Computer Library Center), wrote a popular column a decade ago entitled “MARC Must Die.”[1] In that column he stated: “The problems with MARC are serious and extensive, which is why a number of us are increasingly convinced that MARC has outlived its usefulness.”

Tennant’s article cites several specific problems with MARC’s functions in today’s technological environment: *granularity*, where record subfields do not consistently identify data held in record fields, and applicable identifications are “stuffed” into inappropriate fields, making these records impossible to process automatically as well as they should be; *extensibility,* where further useful data such as tables of contents, book jackets, and reviews are difficult or impossible to encode within the book’s MARC record; *language*, where, although multiple scripts may be supported within MARC, proper processing of these by appropriate software is unmanageable; and *marginalization*, where libraries and the library industry are the only users of MARC, although they are not the only community interested in the bibliographic data it handles.

The column concludes with the statement: “If libraries cling to outdated standards, they will find it increasingly difficult to serve their clients as they expect and deserve.” Tennant’s views that libraries need more flexible and powerful encoding schemes in order to serve present and future needs of users are widely shared by many technology experts in the library community, such as independent consultants Karen Coyle, Diane Hillmann, and Gordon Dunsire, and leaders of International Federation of Library Associations (IFLA) study groups, Mirna Willer of the University of Zadar (Croatia) and Françoise Leresche of the Bibliothèque Nationale de France. Each has written extensively on his or her perspective related to the need for changes to the current state of bibliographic data, echoing many of the points that Tennant put forward.

Recognizing the need to advance bibliographic exchange, the Library of Congress (LC) initiated a community discussion on the Future of Bibliographic Control in 2006 and the report of its recommendations was published in January 2008.[2] That report described a variety of activities the community and the Library should undertake to move toward a more networked management structure for exchanging bibliographic data.

Since that report was issued, libraries have begun to embrace the concept of the Semantic Web and linked data and have implemented specific projects that are elements of a new paradigm for bibliographic exchange. In 2009, a joint project of the DCMI[3] and the Joint Steering Committee for RDA (Resource Description and Access) published the element set for RDA in RDF[4], [5] (Resource Description Framework), a suite of specifications from the W3C for creating metadata structures using Extensible Markup Language (XML) in order to define data on the Web. In 2010, a version of Library of Congress Subject Headings was published using a newly defined W3C Semantic Web format, the Simple Knowledge Organization System (SKOS). [6] The Library of Congress created a site to expose their controlled vocabulary in SKOS and other Semantic Web standard languages. Known as “id.loc.gov,” this site continues to grow as the Library of Congress lays the groundwork for the expression and usage of its data on the Web.

Resource Description and Access (RDA)[7], a structure developed by the Joint Steering Committee that is meant to replace the Anglo-American Cataloguing Rules, 2nd edition revised (AACR-2), already provides a model for mapping some of MARC data into Web resources, but there are significant challenges left in making sure that one can express concepts in a new data format. The Library of Congress announced in October 2011 that the recommendations of the Working Group on the Future of Bibliographic Control[2] and the findings of the test of using RDA[8] led to the conclusion that the MARC standard as a carrier of bibliographic records is not sufficient in the Web-based world. The Library observed that one of the requirements of the digital environment is to work with a broad cross section of the information communities to determine what the successor to MARC should be. Many others in the bibliographic community have expressed similar conclusions and have since added their voice in support of this position. LC recently announced it had contracted with Zepheira to help accelerate the launch of the Bibliographic Framework Initiative. One major focus of this project is to translate the MARC 21 format to a Linked Data model while retaining as much as possible the robust and beneficial aspects of the historical format. As Karen Coyle has pointed out: “The precipitating reason for LC's bibliographic framework project is RDA. One of the clearest results of the RDA tests that were conducted in 2010 was that MARC is not a suitable carrier for RDA.”[9]

Libraries in Europe, in particular, are already moving quickly to transform their data to the new Semantic Web technology in order to increase access for users. Key institutions like the British Library, the German National Library, and the National Library of Sweden have begun issuing all or part of their bibliographic data in RDF. The European Union’s flagship cultural sharing initiative, Europeana, is solidly based in Semantic Web technology. The Virtual International Authority File (VIAF), housed at OCLC, is another important example of international cooperation in this area. One challenge with this variety of experimentation is that it lacks coordination and agreed-upon end results.

Because of the potential, far-reaching impact of library data on global information exchange, W3C recently sponsored an 18-month long “incubator” activity to identify some initial projects that would facilitate the transformation of today's library data to a Web-based format compatible with the W3C's Semantic Web[10] and Linked Data efforts. The final report of that group’s work published in October 2011[11] provided a number of use cases and recommendations for the community on structuring library data so that it can be exchanged via the Web.

Given the diverse community that is impacted by bibliographic exchange and citation as well as the tremendous investments made in existing MARC-based library systems and records, there is a need for high-level coordination of activities to help avoid duplication and fragmentation of the bibliographic exchange community. One critical element of that coordination is the development of a lightweight coordination mechanism to help guide these communities in their work on this complex issue.

A coordinated approach by diverse parties is not a unique or novel idea. Looking into the business sector, we see the Linked Content Coalition acting in the same type of role being suggested here, but for different business sector and media communities. Billing itself as a “global content industry project to improve the management and communication of online copyright,” this group is projecting to “create a framework for a fully interoperable and fully connected standards-based communications infrastructure so that businesses and individuals can manage and communicate their rights.”[12] Equally interesting is that the project was initiated as one of the “Big Ideas for the Digital Agenda” approved by the European Commission.

### **II.b. Rationale**

The Library of Congress has been working intensively on the future of bibliographic control since 2006 when it formed the Working Group on the Future of Bibliographic Control. [13] Links to the key documents related to this work are included in the bibliography of this proposal along with community commentaries, blog posts, and reactions. [14]-[25]

The NISO Content and Collection Management Topic Committee began discussions regarding the need for coordination and standards work in bibliographic exchange in 2010. NISO has also engaged a variety of stakeholders in conversations surrounding the future of bibliographic exchange. Among the communities of engagement included in those conversations were: the bibliographic framework development community, the Web community, the library systems supplier community, and other members of the information standards community. Each of these groups brings to the table its own perspectives on needs and priorities.

These discussions have led to a conundrum of which projects are of highest priority and which will be undertaken by other entities in our community. As a result of this lack of coordination and schedule, the New Bibliographic Framework is being developed *around* the systems developers and the development pipelines of the respective communities (which include organizations like W3C, DCMI, SKOS, and the many libraries involved in Library Linked Data) instead of being developed with them. In addition, as noted above, many organizations are moving forward with their own initiatives to expose bibliographic data, without organized coordination or consensus about community priorities, leading to duplicated work, delays, and inefficiencies.

NISO plays a unique role in the community by providing a neutral forum for discussion of technology, interchange, and best practices—where divergent interests are provided an equal voice in the process of standards development. The future of bibliographic information exchange will touch on a variety of organizations from libraries to systems suppliers, even to publishers and booksellers. While there are many organizations engaging in this conversation, NISO is a trusted third party that specializes in bringing together diverse interests and fostering the development of community consensus on interoperability issues. Therefore, engaging the NISO process to bring together these divergent interests will likely lead to a more equitable and more widely adopted solution to exchanging bibliographic information.

The New Bibliographic Framework being created by the Library of Congress is, as required in today’s political and economic climate, focused primarily on addressing the needs of the Library of Congress and secondarily the wider library community. Despite this environment, the Library is actively working on establishing an advisory group to gather a wide range of additional inputs. Realistically, however, the expectations are that only those needs that can be met within the very confined economic/political boundaries the Library is operating in will make it into the final implementation—and these will be focused on the library community.

Yet the resulting data that will reside in this framework will have an effect on everyone using or citing resources on the Web. Therefore, it is critically important to address the usability of this data from the perspectives of the communities comprised of information technologists, technical practitioners, librarians/technologists from many national libraries, standards organizations, and Semantic Web technologists. Due to a general lack of community progress on the questions raised in this proposal, people are developing work-arounds within their respective silos. These silos include W3C's Semantic Web community[10], the Dublin Core Metadata Initiative[3] (which is working on standards for application profiles in RDF), and IFLA[26] (which now has a Semantic Web Special Interest Group[27]). It may be further compounded in work being undertaken by the Internet Archive[28], the Digital Public Library of America[29], schema.org[30], and the Zotero[31] communities. Karen Coyle has pointed out in her blog that: “Recent efforts have focused on translating library record formats into RDF with the result that we now have:

* ISBD in RDF [International Standard Bibliographic Description in Resource Description Framework]
* FRBR in RDF [Functional Requirements for Bibliographic Records in Resource Description Framework]
* RDA in RDF [Resource Description and Access in Resource Description Framework]

and will soon have MODS in RDF [Metadata Object Description Schema in Resource Description Framework]. In addition, there are various applications that convert MARC21 to RDF, although none is ‘*official*’—that is, none has been endorsed by an accredited standards body”[32] The lack of community consensus standards exacerbates problems of duplicated data and the inherent inefficiencies will become increasingly apparent in the resulting core systems. Many of these groups have expressed interest in trying to work more closely with each other, the Library of Congress, and the other organizations exchanging bibliographic data, so as to avoid a divergence of approaches and formats from happening. However, for that cooperative effort to occur, a study must be performed to understand the needs and requirements of the various bibliographic exchange communities.

### II.c. Project Description

The goal of this project will be to engage a group of key stakeholders from the communities of libraries, system suppliers, and higher education/research institutions, as well as non-traditional users of bibliographic information, in order to develop a statement of needs/requirements and a roadmap for further work that various communities are undertaking or planning to undertake in developing a New Bibliographic Framework based on linked data. These requirements and development plans will be shared with the stakeholders involved, as well as the broader bibliographic community. We expect that these communities will utilize the outcomes of this project in order to coordinate their ongoing development efforts. Specifically, we also hope that this coordination effort will support interoperability and extension of the work of the Library of Congress, the primary developers of the New Bibliographic Framework. This will result in the maximum overall usability of the Framework.

Todd Carpenter, Executive Director of NISO, will lead this initiative and is asking The Andrew W. Mellon Foundation for support of this initiative in two phases: (1) to fund a preliminary one-day meeting of key stakeholders to define the elements of the study, and (2) to fund a series of five (5) webinar meetings of these key individuals and other identified experts (see Appendix A for a potential list of participants) to gather, review, and refine those recommendations/needs for inclusion in the final report that will be prepared by NISO and submitted to the Mellon Foundation in April 2014.

Specifically, it is our expectation that this project will ascertain the necessary elements of a bibliographic standards environment that are implementable, suit our global networked information environment, support data sharing, and are economically viable. The resulting report will recommend suggested methods and coordination points for these key communities to move forward. Furthermore, the grant will be used to reinforce NISO’s commitment to a process that is consistent with principles of openness and consensus. This approach will also increase the sense of community participation in the process and will likely lead to greater adoption of the final outcome.

Todd Carpenter and the NISO Content and Collection Management leadership committee will gather input and recruit the people to serve on this project, but certainly will include many from the tentative list of participants noted above (and included in Appendix A). This list of individuals will be invited to a planning conference call and then to the one-day, face-to-face meeting in Washington, DC[[1]](#footnote-1)♦. At the face-to-face meeting, these 20-25 individuals will discuss the high-level elements that must be included in the study and identify the additional people from the several information communities who will most likely be needed to contribute to the full report and begin the implementation (although it is important to note that the actual implementation of this roadmap is outside the scope of this project). The high-level elements that are to be addressed at this face-to-face meeting would include:

1. Determining how the goals and requirements of the library, system suppliers, and higher education/research communities are to be identified and/or compiled, reviewed, and revised if necessary (as a result of seeing other community needs/requirements).
2. Identifying where duplication of processes and data is occurring, or has the potential to occur, and discussing methods to minimize this from happening.
3. Defining a roadmap of related work in development with an emphasis on collaborative, parallel development tracks. This roadmap will take into consideration the Library of Congress schedule for the New Bibliographic Framework.
4. Establishing key decision points, interface testing, and feedback loops to the Library of Congress and other leading international institutions and system suppliers that are identified and placed on the roadmap.
5. Creating working committees with identified members and agreeing on the schedule of follow-up conference calls and report review.

Following the initial face-to-face meeting, a larger group of approximately 40-50 participants will be formed and will meet monthly via teleconference over the subsequent five (5) months. That group will be divided into subgroups that will conduct the needs assessment, identify the key milestones where coordination checks will need to be performed, and produce a report outlining these steps. One of the webinar meetings in the series will be open to the public and will provide a forum for open comment and discussion prior to the production of the report.

Some of the ideas that have been put forward to NISO and might be topics for consideration in the monthly webinars include those listed below. Interest groups may well overlap different communities.

* Within the Web interest group (which includes system vendors, researchers, end users, and non-traditional users of bibliographic information, as well as libraries interested in exposing their data):
  + Completion of a DCMI Application Profile specification and initial technical implementation of Application Programming Interfaces (APIs) for the new bibliographic framework
  + Expert (see Appendix A for suggested list) review of current library and publisher linked data vocabularies, with an emphasis on sharing and linking on the open Web
  + Support for the implementation of library vocabulary extension mechanisms that allow interested communities to build on the New Bibliographic Framework
* Within the bibliographic framework interest group (which includes system vendors who build systems, libraries who use these systems, and national libraries such as Library of Congress and the British Library):
  + Review and expansion of the bibliographic properties described in RDA for the new framework and their relationships to each other
  + Development of primary controlled vocabularies
  + Mapping of the bibliographic properties to relevant linked data properties available on the Web
* Within the vendor and non-vendor developer interest group:
  + Feasibility study of the bibliographic framework as it will be used for cataloging activities, search, display, and linking
  + Identification of impact upon existing systems including: a) conversion, b) maintenance, and c) machine interfaces
  + Transition plan that takes into account the needs of the library vendor and developer community and the ability of libraries to absorb the real and related costs of the proposed changes
* Within the standards development interest group:
  + Metrics for analysis of the new format that will provide a measure of its success
  + Economic analysis of the transition costs and the potential benefits
  + Collaboration and maintenance procedures for ongoing management of the framework
  + Education among the constituent communities on the transition and implementation requirements

The report and roadmap that will be the outcome of this project will help the communities to establish at a high level the development priorities and coordination points needed with the Library of Congress, the British Library, NISO, OCLC, IFLA, DCMI, NISO Automation Vendors Industry Advisory Council (AVIAC) members, other non-traditional participants, and other key players in bibliographic exchange. NISO already has assurances from senior management within the Library of Congress that they will assign staff to participate in this initiative, should it be funded. NISO will extend invitations to other national library bodies and encourage their participation in this important collaboration.

If funded, the project will be administered by NISO and its staff, including all logistical and technical support for the group and financial reporting of the project.

### **II.d. Detailed Project Schedule**

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| Grant submission by NISO staff | August 2012 |
| Grant determination by the Mellon Foundation | October 2012 |
| Grant award by the Mellon Foundation | November 2012 |
| Planning teleconference call led by NISO staff with working group members | November 2012 |
| Initial face-to-face meeting held by NISO staff with invited participants | Either March 2013 (in Washington, DC)  or in April 2013 (coincident with Association of College & Research Libraries (ACRL) Conference in Indianapolis, IN) |
| Bi-monthly webinars led by NISO staff with teams of experts who are established to do a more complete job of providing input to sections of the report | May – September 2013 |
| Public comment webinar run by NISO staff | August 2013 |
| Preparation of public report and roadmap by NISO staff | December 2013 |
| Release of public report and roadmap | January 2014 |
| Public discussion of next steps led by NISO staff and working group members | January 2014 (coincident with American Library Association (ALA) Midwinter in Philadelphia, PA) |
| Final report/narrative submitted to Mellon Foundation prepared by NISO staff | April 30, 2014 |

### II.e. Deliverables and Benefits of the Project

The proposed study and the resulting report, which will be distributed electronically via the NISO website and will be broadly publicized with articles written by NISO staff or members of the working groups, will be the primary output of this grant. We believe that if the report is developed carefully with the right mix of involved people and organizations, it will serve as a coordination mechanism for those developing, implementing, and utilizing the New Bibliographic Framework.

We see the specific benefits of this project as the following:

1. Ensuring that the needs and requirements of a broad category of stakeholders from organizations like the W3C, DCMI, standards organizations, and technologists (library-related organizations, but not focused purely on libraries) are gathered and considered in the development of the New Bibliographic Framework so that linked data provided through this framework can be utilized both within and external to the traditional library community
2. Identification of areas where new standards are needed to effectively use or extend the use of the New Bibliographic Framework
3. Creation of a high-level, coordination mechanism for the Library of Congress and the organizations wishing to implement the New Bibliographic Framework in a collaborative and efficient manner
4. A defined pathway for libraries to enable them to more readily and easily provide library-related services and collections in an expanded set of Web environments

### II.f. Long Term Sustainability

The proposed study and report are designed to ensure the overall long-term sustainability of the New Bibliographic Framework in the larger networked information environment. Any subsequent work to implement the recommendations will be the work of NISO, the Library of Congress, and other community organizations. Long-term management of that coordination work will be a subject of discussion during the project among the participants.

There will be a need to carry out subsequent implementation projects to test parts of the New Bibliographic Framework, although support for those pilot projects is not included as part of this proposal and will be aligned with the implementation plan produced by the Library of Congress. That work could be conducted and supported directly by a library, NISO, partner organizations, and/or possibly through additional subsequent proposals to the Foundation.

II.g. Reporting

Following completion of the project, NISO will submit a report to The Mellon Foundation by April 30, 2014. The report will synthesize the work of all of the groups into a final plan based on the input gathered. This study and the resulting report will also recommend the roles and responsibilities to be handled by the constituent communities, not only during the project but going forward as well. This report will also contain the financial reports and commentary on the expenditures made under the grant.

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1. *♦ Given our proposed timeline, we note that some of the attendees may wish to hold the meeting in conjunction with the ACRL meeting in Indianapolis IN during April 2013. Should the group prefer that option, there will be a resulting savings in hotel and travel expenses. However, we expect that a DC meeting would be more convenient and that many of the attendees, particularly those from overseas would likely not attend ACRL. The greatest and most expert participation will be our overriding goal, with cost savings also an important factor in this decision.* [↑](#footnote-ref-1)