Final Report

of the
Canadian BIBFRAME Readiness Task Force

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Submitted to the Cataloguing and Metadata Standards Committee
October 9, 2020

As Chair of the Task Force, I would like to offer my sincere thanks to each of the members and extend my gratitude to the institutions that supported them in their contributions:

I would also like to thank Christopher Carr and the other members of the CFLA Cataloguing and Metadata Standards Committee for forming the Task Force, asking me to be chair, and their support throughout the past two years.

A special thanks also to Stacy Allison-Cassin, Timothy Knight, Trina Grover, and Robin Desmeules of the CFLA-FCAB Indigenous Matters Committee (IMC) for their fulsome discussion with the task force regarding BIBFRAME readiness in Canada in light of the Truth and Reconciliation process, and to Library and Archives Canada for their contributions to conversation around future collaborations within the Canadian Library community and ongoing support of BIBFRAME readiness in Canada.

Heather Pretty
Chair, Canadian BIBFRAME Readiness Task Force

Introduction and Background

In 2012, Philip Schreur, Associate University Librarian for Technical and Access Services at Stanford Libraries, stated that the "conversion of our bibliographic records from MARC to linked open data will become one of the most powerful drivers in the transformation to the Semantic Web, placing our data and resources where people are searching, and tying them intelligently to the wealth of the Web." Now in 2020, with the goal to enable library metadata to interact with the ever-growing network of linked data on the Web, the U.S. Library of Congress (LC) is nearing full implementation of the [Bibliographic Framework Initiative](#) (BIBFRAME) as its replacement for the MARC record format. It is anticipated that in 2021, LC will move to cataloguing solely within the BIBFRAME format, and will rely on its BIBFRAME2MARC and MARC2BIBFRAME converters to share MARC records with the rest of the library community. Although many of us will not be ready to transition to BIBFRAME for some time, we will increasingly see the effects of BIBFRAME within the MARC record ecosystem.

In the past few years, several individual libraries and collaborations of libraries around the world have either moved or are in the process of transitioning to the BIBFRAME format. Vendors as well as some groups of libraries are now working to develop tools, methods, and workflows to catalogue in BIBFRAME, as well as to develop discovery layers for end-users to search BIBFRAME data. The international library community has now reached a tipping point from which it will see more and more libraries transitioning away from MARC and into BIBFRAME and other linked data formats. Next steps for libraries will be to investigate how BIBFRAME and other library linked data initiatives can connect with the increasing quantity of linked data on the Semantic Web, such as schema.org and Wikidata (Allison-Cassin & Scott, 2018; Scott, 2014).

In 2015, a group of Canadian libraries took the proactive step of coming together through the Canadian Linked Data Initiative (CLDI) as a venue for discussion on all aspects of linked data initiatives in Canadian libraries[1]. There were eight working groups with members from across Canada to cover Digital Projects, Education and Training, Grants, IT, Metadata, Planning, and User Experience, as well as the Groupe francophone. Many working groups included discussion about BIBFRAME as part of their larger conversations, acknowledging that — although it will be a significant step for many — BIBFRAME is only one part of transitioning library metadata to linked data.

Behind the Canadian BIBFRAME Readiness Task Force mandate is the idea that the Canadian library community will be more successful in adapting to BIBFRAME and a linked data environment by coming together and moving forward together. As a community, what do we already know about BIBFRAME and linked data? And what are the foundations we all need to learn so that we are each prepared to make decisions about when, how, and if each of our institutions will make the transition from MARC to the BIBFRAME format?

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[1] [Canadian Linked Data Summit](#), McGill University, October 24 - 25, 2016.

Task Force Mandate

The Task Force was established in the fall of 2018 by the CFLA-FCAB Cataloguing and Metadata Standards Committee/Comité sur les normes relatives au catalogage et aux métadonnées (CMSC) in partnership with Library and Archives Canada, FMD (Fédération des milieux documentaires), and the Library of Parliament.

The creation of the CMSC itself was officially approved by the CFLA-FCAB Executive Board in July 2017. CMSC was charged with assuming some of the CLA Technical Services Network's roles and responsibilities, including nominating CFLA-FCAB representatives to two seats formerly held by CLA on the Canadian Committee on Cataloguing (CCC) and the Canadian Committee on Metadata Exchange (CCM). One of the [mandates of the CMSC](#) is to "Advise the Board when CFLA-FCAB needs to develop and promote its library communities' positions on cataloguing and metadata standards and issues." The work of the Task Force supports that mandate as well as the CMSC further mandate to "oversee the development of appropriate position statements and supporting documentation and strategies."

The [mandate of the Task Force](#) is to produce documentation that outlines the impact of migrating from MARC to BIBFRAME on libraries in Canada; to assess the understanding of and readiness for BIBFRAME transition in libraries in Canada; and to make recommendations for how CMSC and CFLA-FCAB and FMD can support Canadian libraries' transition to BIBFRAME.

The Task Force has met its mandate through the publication of a plain-language description of BIBFRAME in [English](#) and [French](#); distribution of a survey in English and French at the end of 2019; presentation of the Task Force's progress at the OLA Superconference in January 2020 (Carr et al., 2020), at the Canadian Association for Information Science in September 2020 (Fortier et al., 2020), and at the BIBFRAME Workshop in Europe in September 2020 (Bigelow & Pretty, 2020); and finally through the Task Force's recommendations to CMSC at the end of this final report, which are in turn supported by the results of the conducted survey.

Plain-Language Description of BIBFRAME

In October 2019, the Task Force published "A Plain-Language Description of BIBFRAME and Its Potential Impact on Canadian libraries" in [English](#) and [French](#) through the CFLA-FCAB and FMD websites. Designed primarily as an awareness-raising tool for the Canadian library community to start thinking actively about BIBFRAME, the Plain-Language Description includes a brief overview to provide the Canadian library community a basic understanding of the BIBFRAME model that will enable them to understand the potential impact of a possible transition away from our current MARC-based systems. Versioning information was added to the document in early 2020 in anticipation that the Plain-Language Description will need to be updated over time as BIBFRAME evolves and Canadian libraries begin migration. While various benefits are to be expected from BIBFRAME implementation, the transition to BIBFRAME will also deeply transform the cataloguing landscape. Even if some Canadian libraries decide not to

adopt BIBFRAME, they will need to proactively prepare to ensure their workflows are not compromised by the growing presence of BIBFRAME data.

Current context of BIBFRAME adoption/migration

The adoption and migration within the cataloguing community from AACR2 to the RDA (Resource Description and Access) content standard over the past 17 years has revealed significant deficiencies in the MARC encoding standard. MARC, which is used by most Canadian libraries, cannot easily accommodate new ways of recording bibliographic data elements prescribed by RDA. Since its initial release from LC in 2011, BIBFRAME has outlined a potential path forward to replace the MARC format, and while it has taken considerable time and effort the cataloguing community now finds itself in a period of significant flux.

A shift in more recent years to an early implementation phase began in a more concrete way shortly after the release of BIBFRAME 2.0, with the release of conversion tools and specifications, comparison tools, and the BIBFRAME editor. The release of these open-source tools in 2017 allowed for further development and testing of standards and best practices in many institutions and communities. BIBFRAME adoption around the world is covered briefly in the Task Force's Plain Language Description, including descriptions of the 2018 European BIBFRAME Workshop, the 2019 BIBFRAME Workshop in Europe, and the first national library to fully transition to linked data with the application of BIBFRAME 2.0 to Libris XL ("KB Becomes the First National Library to Fully Transition to Linked Data", 2018).

Within North America, the most significant collaboration has been through the Linked Data for Production (LD4P) Mellon-funded series of grant projects. The first LD4P grant, 2016-2018, laid the foundation which the following two grants continue to build upon with a focus on developing standards, guidelines, infrastructure, and ontologies to create linked open data. LD4P2: Pathways to Implementation, 2018-2020, has been a "collaborative project among four institutions (Cornell, Harvard, Stanford, and the University of Iowa School of Library and Information Science) and the Library of Congress and the Program for Cooperative Cataloging" (Futornick, 2019). Significantly, LD4P2 includes a Cohort of 17 academic libraries (in addition to the 4 institutions collaborating directly with LC) committed to transitioning their MARC-based workflows to linked data. As such, this project has seen collaborative development and testing of an application of the Sinopia linked data editing platform, the Question Authority entity lookup suite, and associated copy and original cataloguing in a range of application profiles by Cohort member libraries.

LD4P3, 2020-2022, has only just started with the aim of Sinopia expansion, a Question Authority extension, integration with OCLC's Entity Backbone, the creation of a PCC Data Pool (CONSER and BIBCO data in BIBFRAME through Share-VDE), work on data flow and connecting systems, the expansion of the PCC Cohort, and sustainability planning (Schreur, 2019). This phase of the project indicates ongoing work and refinement of processes, but the title of the project "Closing the Loop" also indicates the objective to move to implementation.

In addition to collaboration with the LD4P2 project, the PCC supports the shift to linked data for its community through its January 2018-December 2021 Strategic Directions, its Linked Data Advisory Committee, and its task groups on Linked Data Best Practices, Identity Management in NACO, and URIs in MARC. In particular, the PCC Strategic Directions note the need for a significant shift from experimentation to implementation, and emphasize the expansion of the PCC community and collaborations to include work alongside other linked data-focused groups, including LD4P and Share-VDE.

Creating significant overlap with the LD4P projects, the Share-VDE conversion and enrichment processes have been utilized for the creation of the data pool for LD4P2 (the full collection of the 22 libraries converted to BIBFRAME 2.0). While connected to LD4P, Share-VDE is a separate project with international participation working on BIBFRAME implementation. Share is a library driven initiative with the participation of 37 libraries worldwide (including 5 national libraries), with the support of Casalini Libri and @Cult, an Italian software company, to create an effective working environment for the use of linked data (Sparling et al., 2019).

Additionally in North America, in 2020 OCLC was awarded "a grant from The Andrew W. Mellon Foundation to develop a shared 'Entity Management Infrastructure' that will support linked data management initiatives underway in the library and scholarly communications community." (OCLC, 2020) With the various roles OCLC plays in the library metadata landscape this is an important step forward. Moreover, as demonstrated by Ex Libris and Folio, library systems vendors are forging ahead as well.

In 2018, LAC migrated Canada's union catalogue to an OCLC WorldCat platform; as a result, the data of Canadian libraries is only available to OCLC members, and only in MARC21 format. For LAC to support the adoption of BIBFRAME by Canadian libraries, it must ensure that the national union catalogue supports the inclusion of, and provides access to, BIBFRAME linked open data.

To date, Canadian participation in BIBFRAME development and implementation has been limited. The University of Alberta Library is a member of LD4P2 and Share-VDE as part of a wider approach to BIBFRAME and linked data implementation (Bigelow et al., 2019). As well, Canadian libraries are engaging with the PCC through institutional commitment and individual Canadian participation in the PCC Policy Committee, the Task Group on URIs in MARC, and the Linked Data Advisory Committee. Since the Canadian Linked Data Initiative went dormant in 2018, there has been no pan-Canadian communication channel regarding BIBFRAME or other Canadian-specific library linked data opportunities. However, as outlined by the survey results and analyses below, few libraries in Canada are fully prepared to transition from MARC to BIBFRAME in the near future.

Regardless of an institution's implementation status, BIBFRAME is now a part of our metadata landscape, and out of necessity for data exchange and reuse this will have a significant impact in Canada and around the world. Although MARC will not go away overnight, and Canadian

libraries do not need to rush towards implementation of BIBFRAME, we should develop a plan for how we can work together to adapt and move our metadata into a linked data environment.

Scan of current and emerging influences in the library linked data landscape

BIBFRAME is one path to publishing bibliographic descriptions as linked data as a means to make bibliographic metadata more interoperable with RDF (Resource Description Framework) web standards and technologies. Libraries who wish to follow the lead of LC will be motivated to move to encoding with BIBFRAME. As well, those who participate in a standardized resource description community such as the PCC, will be encouraged to adopt BIBFRAME sooner rather than later. However, there are many other types of library linked data structures and models in development and being piloted. It remains to be seen how BIBFRAME will connect with and/or map to other library-related linked data initiatives or whether wholesale linked data alternatives to BIBFRAME will be implemented. The following are a few current relevant initiatives:

- Wikidata - the Wikimedia Foundation's platform for open and structured linked data - is powered by the openly available Wikibase knowledge base software. It has garnered much attention in the library community recently through the LD4P-Wikidata Affinity Group facilitated by Stanford and other GLAM and Wikimedia initiatives. The platform and infrastructure supporting it offers low barrier access to creating and publishing linked data. OCLC and the PCC are also piloting some linked data initiatives with Wikidata, and many GLAM institutions are carrying out their own work independently.
- Schema.org is a structured web data vocabulary supported by major search engines. Unlike BIBFRAME, it is not exclusive to the library sector and is utilized across all industries and domains. Intended to be embedded in web pages, this vocabulary aids their discoverability and visibility through being indexed and crawled by search engines (Wallis, 2018). With BIBFRAME developed around the same time as Schema.org, a community initiative called Bibframe2Schema.org emerged to map BIBFRAME 2.0 to Schema.org, enrich BIBFRAME 2.0 data with Schema.org terms and conversely, create Schema.org terms from BIBFRAME 2.0 data.
- Adding URIs to MARC records. The addition of URIs to MARC records is a practice encouraged by the PCC to optimize library data for the web and expose bibliographic records as linked data through embedded URIs. Cataloguers in Canada will continue to see more URIs in authorized access points of MARC records originating from PCC member institutions, especially considering the current PCC URIs in MARC Pilot project. To support this practice, MarcEdit developed and provides a tool to look up and embed linked data in the form of URIs in the subfield 0 of MARC records. As well, an increasing number of library-related identifiers are being published in RDF format, for example, through collections such as the LC Linked Data Service.
- RDA Toolkit Restructure and Redesign Project (3R Project). RDA is a constrained RDF element set with instructions for recording values aligned to each element, ensuring semantic consistency. The update to RDA as a result of the 3R Project is based on the 2017 IFLA LRM (Library Reference Model) and as such anticipates the use of linked

data within bibliographic description, though does not require the use of linked data. Switchover to the new RDA Toolkit is set for December 15, 2020. A challenge for the Canadian cataloguing community will be training on the new concepts with the switchover and gradual implementation. Because the RDA Toolkit's content is partly the product of linked data, it may be the case that cataloguers will become more familiar with linked data concepts and excited about linked data's possibilities.

Canadian considerations for library linked data

● Bilingualism/Multilingualism. Efforts to move to BIBFRAME should be supported in both French and English, Canada's official languages. The Task Force has been modelling this recommendation by translating its outputs in both languages (i.e., Plain-Language Description, BIBFRAME Readiness survey). Relevant RDF vocabularies should be available in English and French. Part of the promise of linked data is the ability to present our catalogues in a variety of languages. The Canadian library community will be particularly interested in seeing this come to fruition, especially considering our large number of Indigenous languages and cultures.

● Truth and reconciliation with Indigenous Peoples in Canada. In consultation with members of the CFLA-FCAB Indigenous Matters Committee, the Task Force recognizes that library metadata standards are rooted in colonial conceptualizations of knowledge and continue to be sites of injustice. BIBFRAME is an extension of past metadata standards and was not built with an intention to advance and implement reconciliation. Further analysis and community engagement are needed to better understand how the contextual origins of BIBFRAME encode and reinforce a colonial view of the world, as well as to determine the role of BIBFRAME in reconciliation with Indigenous peoples in Canada. The BIBFRAME community, including this Task Force, has not fully addressed this vital issue and more work must be done. Canadian participation in BIBFRAME has been limited, and opportunities to consider new ways of representing knowledge about Indigenous peoples within BIBFRAME have also been limited.
The Task Force is confident that moving from MARC to a linked data solution like BIBFRAME will better support and accommodate the interaction of library metadata with other linked data format vocabularies and ontologies, including those representing Indigenous cultures, such as First Nations, Métis, and Inuit Indigenous Ontology (FNMIO) or First Nations House of Learning (FNHL). Considering the scope of BIBFRAME as a framework for describing bibliographic objects, the library community needs to work toward constructing a linked data ecosystem that respects all ontologies and ways of thinking. During implementation of any linked data solution, including BIBFRAME, the library community should strive to follow recommendation 5 of the [CFLA-FCAB Truth and Reconciliation Committee](#) to "Decolonize Access and Classification by addressing the structural biases in existing schemes of knowledge organization and information retrieval arising from colonialism by committing to integrating Indigenous epistemologies into cataloguing praxis and knowledge management."

Stakeholders in Canada

Several key Canadian organizations have a significant impact in the landscape of standardized bibliographic description and greatly influence the practices of most Canadian libraries, who will turn to these organizations for guidance and leadership when considering a move from MARC to linked data alternatives such as BIBFRAME. Among the most influential of these organizations are:

- Library and Archives Canada (LAC). The national library currently plays and is expected to continue playing a role in developing national bibliographic description standards. As the steward of *Canadian Subject Headings* (CSH) vocabulary, currently made available in MARC format, it will need to make a decision about whether to convert it into linked data. LAC is a permanent member of the international [PCC Policy Committee](#). It also has relationships with two national committees focusing on cataloguing standards:
  - The Canadian Committee on Metadata Exchange (CCM) is an advisory committee on national and international standards related to the representation of bibliographic information through machine-readable encoding. CFLA-FCAB and FMD are core members of CCM. On behalf of Canadian libraries, CCM reviews and proposes changes to the MARC encoding standard. CCM is represented by LAC on the MARC Advisory Committee (MAC).
  - The Canadian Committee on Cataloguing (CCC) is a national advisory committee on matters related to cataloguing and bibliographic control. CFLA-FCAB and FMD are core members of CCC. LAC provides the permanent secretariat for the CCC. The CCC represents Canada on the North American RDA Committee (NARDAC), which represents North America on the RDA Steering Committee (RSC).
- Canadian Federation of Library Associations-La Fédération canadienne des associations de bibliothèques (CFLA-FCAB). Among the strategic goals of this national voice for Canadian libraries is to anticipate and respond to the changing information environment through developing, monitoring, and supporting the adoption of national policies and guidelines. The Cataloguing and Metadata Standards Committee/Comité sur les normes relatives au catalogage et aux métadonnées (CMSC/CNCM) advises the Board when CFLA-FCAB needs to develop and promote its library communities' positions on cataloguing and metadata standards and issues, and oversees the development of appropriate position statements and supporting documentation and strategies. CFLA-FCAB is a core member of both CCC and CCM and is the Canadian copyright holder for Resource Description and Access (RDA).
- Fédération des milieux documentaires (FMD). FMD represents francophone library communities in Canada and supports its members in engaging in current and emerging developments. The Section Traitement documentaire et métadonnées of the FMD offers both cataloguing librarians and technicians a forum for sharing ideas and professional development opportunities. FMD and CMSC/CNCM are partnering on several projects

such as this Task Force to ensure francophone representation and input on the development and promotion of national cataloguing and metadata standards. FMD is a core member of both CCC and CCM.

- Bibliothèque et Archives nationales du Québec (BAnQ). Through its Direction des métadonnées et de la normalisation bibliographiques, Bibliothèque et Archives nationales du Québec is actively involved in developing bibliographic standards and promoting best cataloguing practices among francophone libraries in Québec and Canada. BAnQ serves as a consulting organization on the CCC and has participated in the French translation of important cataloguing tools such as RDA, the RDA registry, and the Dewey Decimal Classification. BAnQ has worked with LAC to establish common policy statements for the application of RDA. More recently, BAnQ has joined forces with LAC and Québec university libraries to create the Programme francophone des autorités de noms (PFAN), a French-language name authority cooperative. Finally, it is important to mention that through its Service québécois de traitement documentaire (SQTD), BAnQ acts as an important supplier of bibliographic data. In order to ensure it will not disrupt existing bibliographic description workflows, BAnQ's decisions regarding linked data implementation will be influenced by the decisions of Canadian partner institutions and by the level of preparedness of Québec libraries.
- Université Laval. The university maintains *Répertoire de vedettes-matière* (RVM), the French language subject headings thesaurus used in Canadian French-language cataloguing. RVM contains French language equivalents for LCSH, LCGFT, LCMPT, LCDGT, CSH, MeSH, and AAT as well as unique French language subject headings with no English language equivalents. Like LAC, it will need to make a decision about whether to convert them into linked data, thus making them available for use with BIBFRAME and other RDF ontologies. Université Laval, LAC, BAnQ, certain Québec university libraries, and some RVM clients have struck a working group in order to review the RVM business model and explore ways to provide open access to the RVM vocabularies through linked data. Documentation generated in the course of the project is available on the RVM website.

Survey of the Canadian Library Community

Survey research was selected to obtain a portrait of the Canadian library community at large. The questionnaire contained questions that sought to assess the (1) understanding of BIBFRAME and (2) readiness to transition to BIBFRAME, and to collect (3) demographic data about the institution where the person answering the survey worked as well as the respondent's role within the library. To assess understanding, a series of questions with multiple-choice answers about linked data fundamentals, BIBFRAME vocabulary, BIBFRAME and other RDF vocabularies, and BIBFRAME hands-on were designed. To mitigate the effects of random guessing, each question contained "I don't know" as an option and was accompanied by a self-rated ranking of confidence in the correctness of the respondent's answer[2]. To assess readiness, a psychometric assessment developed to measure organizational readiness for implementing change (Shea et al., 2014) was used. This instrument includes a five-item scale about change commitment, a six-item scale about change efficacy, and nine items representing various aspects of how much value respondents would place on a change.

Survey participants were selected from a list of 5,812 libraries, which was assembled using data from libraries.org (Breeding, 2019) and Library and Archives Canada's (2019) interlibrary loan database. Libraries were then clustered into four mutually exclusive categories: academic libraries (6%), public libraries (36%), school libraries (14%), and special libraries (44%). Using these categories, a stratified random sample of 1,500 libraries was selected. After two pilot phases, an invitation to the study with a link to answer the study in English or French was sent on 14 November 2019 through Qualtrics survey software targeting "the person most directly responsible for cataloguing" and "the person most directly responsible for systems". An invitation was sent to another 125 libraries to replace the emails that had failed to be delivered. Two reminders were sent and the survey closed on 31 December 2019. 289 completed questionnaires were received. Two questionnaires indicated "library vendor" as their library type and were rejected on that basis, bringing the total of questionnaires analysed down to 287. While this response rate (19%) is not optimal, it is in line with studies using online surveys[3] and allows for drawing a portrait that includes various kinds of institutions within the Canadian library community.

Questionnaires were returned from institutions located in ten provinces and one territory. 53% reported having a catalogue in English only; 29%, a catalogue in French only; and 17%, a multilingual catalogue. The proportion of public libraries (36%) follows their weight in the sample while academic libraries (16%) are over-represented, and special libraries (37%) and school libraries (9%) are underrepresented. The majority of libraries (65%) surveyed employ 1 to 5 librarians while 19% employ none. The majority of libraries (57%) report having 1 to 5 staff members. The participants' primary responsibilities within the library vary greatly, the three most common being administration (22%), cataloguing and metadata (19%), and "all of the above"
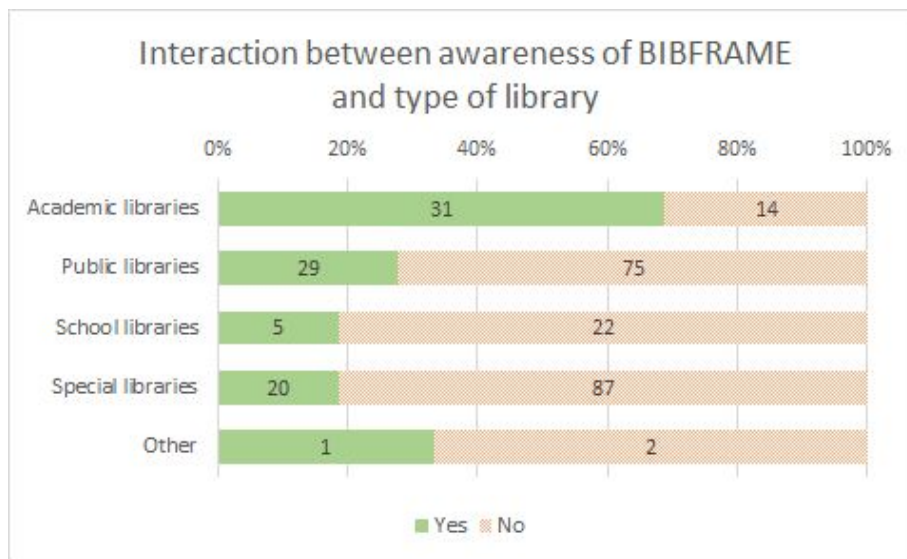
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[2] See, for instance, Peşman & Eryılmaz (2010).
[3] See, for instance, Nulty (2008), Yan & Fan (2010) and Hardigan et al. (2016).

(17%). A finer analysis of the answers indicates that 38% have "cataloguing responsibilities". Nearly three quarters of the participants (74%) are responsible for training other employees while 46% have other employees reporting to them.

The results first indicate that only 30% of respondents were aware of BIBFRAME as a replacement for the MARC bibliographic format prior to the survey. This proportion is higher for academic libraries (69%), and lower for public libraries (28%), special libraries (19%) and school libraries (19%; see Figure 1 below)[4]. The proportion is also higher for libraries having more than 5 librarians (6-10, 57%; 11-20, 85%; 21-50, 88%; >50, 50%; see Figure 2 below) or more than 5 staff members (6-10, 31%; 11-20, 46%; 21-50, 52%; >50, 75%; see Figure 3 below). Of the 16% of respondents whose libraries report holdings to OCLC, 62% had heard about BIBFRAME prior to the survey. Respondents who indicated "cataloguing and metadata" (54%), "systems" (39%), or "technical services" (38%) as their primary responsibility were also more likely to be aware of BIBFRAME in comparison to respondents who had other roles, including "all of the above" (14%).

Figure 1.

Figure 2.

Interaction between awareness of BIBFRAME and number of librarians

Number of librarians	Yes	No
0	8	45
1-5	45	140
6-10	13	10
11-20	11	2
21-50	7	1
> 50	2	2

Figure 3.

Interaction between awareness of BIBFRAME and number of staff

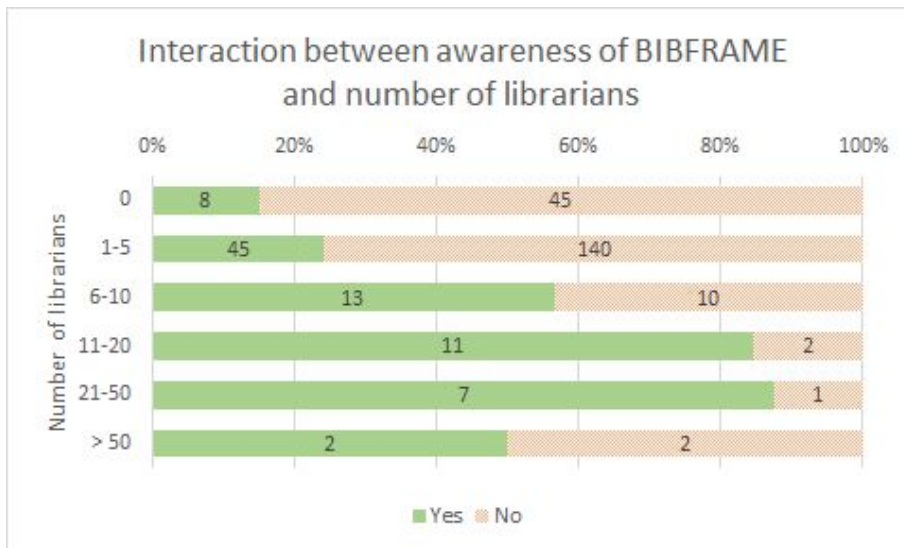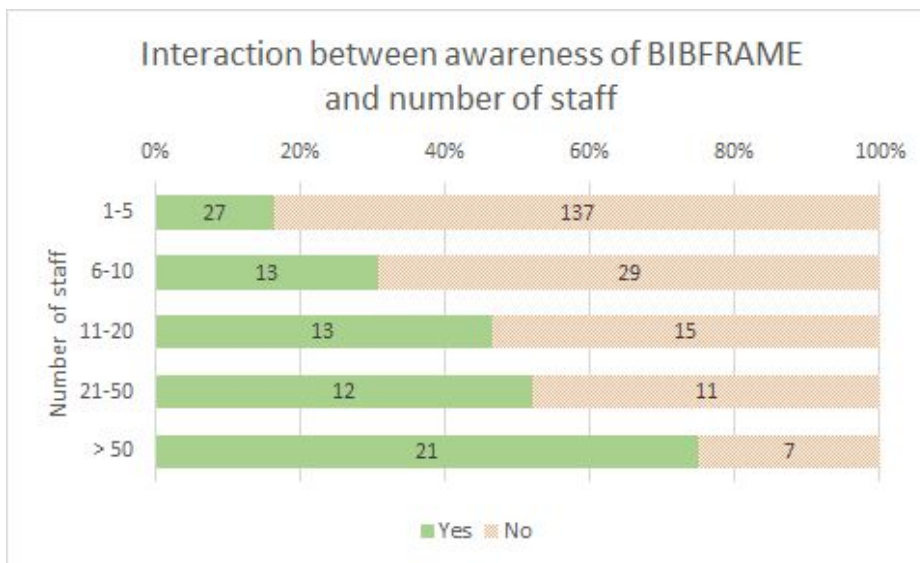| Number of staff	Yes	No
1-5	27	137
6-10	13	29
11-20	13	15
21-50	12	11
> 50	21	7

The results also indicate that 85% of the libraries surveyed do not yet know enough about BIBFRAME to consider planning a transition. This proportion is slightly lower for academic libraries (82%), school libraries (82%), and special libraries (81%), and slightly higher for public libraries (91%). For other variables measured, no specific trend can be observed. Only 1% of the libraries surveyed indicate that their transition from MARC to BIBFRAME is already underway. Among the libraries who are planning a transition, only 4% plan to transition within the next ten years, which mirrors the proportion of libraries (4%) who plan to keep using MARC records and not transition to BIBFRAME.

Respondents who indicated that they had heard of BIBFRAME prior to the survey were invited to answer questions regarding their readiness to transition to BIBFRAME and their understanding of BIBFRAME. Results indicate that, even for those who were aware of BIBFRAME, participants were neither committed nor opposed to transition. Participants were invited to rate their level of agreement with 5 items measuring their library's commitment to transition from MARC to BIBFRAME from 0 to 10, and the average for this commitment score is 19 (out of 50). Participants were also invited to rate their level of agreement with 6 items measuring their library's ability to make the transition from 0 to 10, and the average for this ability score is 26 (out of 60). Finally, they were asked to rate 9 items measuring different aspects of the perceived needs, benefits, and harms for their library to make the transition (such as cost-effectiveness and timeliness of the transition), and scores for individual items all have a median of 5 or 6 (out of 10). Results do not indicate interactions with any of the demographic variables.

Respondents who indicated that they had heard of BIBFRAME prior to the survey were also asked to answer a series of multiple-choice questions designed to evaluate their knowledge of linked data fundamentals, BIBFRAME vocabulary, BIBFRAME and other vocabularies, and BIBFRAME hands-on. The rate of correct answers is low, and for every question, the most frequent answer is "I don't know" (see Table 1 below for the questions and distribution of answers). Results do not indicate interactions with any of the demographic variables.

Table1.

Distribution of answers for questions measuring the understanding of BIBFRAME			
Questions	Correct answer	Wrong answer	"I don't know."
True or false: every RDF triple consists of exactly one subject, one predicate, and one object.	44%	7%	49%
True or false: each of the subjects, predicates, and objects of an RDF triple must be associated with a uniquely identifying link, called a Uniform Resource Identifier (URI).	12%	42%	46%
Select each valid RDF serialization in the following list: JSON-LD, MARC, N-Triples, RDA, RDF/XML, Turtle.[5]	10%	29%	61%
To represent a resource in your library collection, what are the base classes that must appear in a description using the BIBFRAME vocabulary?	23%	33%	44%
What set of BIBFRAME statements properly represents the Dewey Decimal call number of a book in your library collection?	14%	11%	75%

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[5] For multiple answer questions, an answer was considered correct when all the correct choices and no wrong choice were selected.

When the subject heading is identified by a link, what is the best way to express a subject heading for a book using the BIBFRAME vocabulary?	11%	13%	76%
Select each of the vocabularies that can be used with BIBFRAME: Bibliographic Ontology (BIBO), Dublin Core Metadata Initiative (DCMI), Schema.org, Resource Description & Access, FRBR-aligned Bibliographic Ontology (FaBiO).	5%	41%	54%
Select all of the sources of links that BIBFRAME allows for use as identifiers in resource descriptions: Library & Archives Canada (lac-bac.gc.ca), Library of Congress (id.loc.gov), Online Computer Library Center (oclc.org), Virtual International Authority File (viaf.org), Wikidata (wikidata.org), Any web domain.	14%	23%	63%
What kind of interface will most cataloguers use to create a resource description in BIBFRAME?	21%	8%	71%
How will most people find library resources that have been described with BIBFRAME?	33%	10%	57%

In summary, most respondents had never heard of BIBFRAME prior to the survey and indicated they don't know enough about BIBFRAME to plan a transition. Even among those respondents who had heard of BIBFRAME previous to receiving the survey, knowledge of BIBFRAME and related concepts is low and they have minimal readiness to transition from MARC to BIBFRAME. The relatively large percentage of respondents answering "I don't know" to questions regarding the fundamentals of linked data and BIBFRAME reinforces the need for linked data and BIBFRAME training across Canada. The survey indicates that those with cataloguing responsibility have the most awareness of BIBFRAME. Results, however, suggest that their knowledge of BIBFRAME is not significantly better, which suggests that work still needs to be done in the cataloguing community to increase knowledge of BIBFRAME.

List of Recommendations to Support BIBFRAME Transition in Canada

Recognizing that BIBFRAME will likely replace MARC as the encoding scheme used by most libraries, the Task Force recommends that CFLA-FCAB, Library and Archives Canada, and Fédération des milieux documentaires continue to work together to provide support for BIBFRAME transition in Canada. While it has been suggested that transition to BIBFRAME will occur over a period of 10-15 years, the Task Force recommends that a joint CFLA-FCAB/LAC/FMD working group be formed now to monitor the development of BIBFRAME and prepare for the expected transition on behalf of all Canadian libraries currently working in a MARC environment.

The Task Force recommends the new working group continue the work of the current Task Force with five broad goals/mandates:

- Communication and Information Sharing
- Continued Organizational Support
- Community Engagement
- Participation in Standard Development
- Community Support for Education and Professional Development

Communication and Information Sharing

The Task Force recommends that a "communication channel" be established to inspire conversation within the library community about BIBFRAME readiness news and developments in Canada, and recommended actions that can be taken by library associations, library schools, and individual libraries. This "communication channel" could include:

- Campaigning to raise strategic awareness and education for BIBFRAME and other RDF-based standards in Canada.
- Advocating for communication channels among Canadian libraries and stakeholders to discuss the transition to BIBFRAME on a national, international, and vendor level.
- Advocating for more Canadian libraries and stakeholders to participate at an international level.
- Exploring ways to inspire conversation between libraries and the vendor community.

Continued Organizational support

Given their historical collaboration on cataloguing and metadata standards development and maintenance, implementation, and training in Canada, the Task Force strongly recommends Library and Archives Canada, CFLA-FCAB and Fédération des milieux documentaires continue to provide resources to inform, educate, and support the Canadian library community in its transition to BIBFRAME. The Task Force recommends national level grants be pursued to provide funding for potential costs to support training and other pan-Canadian initiatives.

<u>Library and Archives Canada</u>

- The Task Force recommends that LAC provide a clear public statement about their on-going level of national and international engagement in BIBFRAME development and implementation.
- The clear public statement should include a list of international associations, collaborations, and committees on which LAC has representation, and what other ways LAC engages with the international community regarding BIBFRAME.
- LAC will continue to support and participate in BIBFRAME readiness initiatives in Canada, for example
  - Committing to make Canadian Subject Headings and other library vocabularies freely available in RDF, in a format compatible with BIBFRAME and linked data applications.
  - Ensuring that the national union catalogue supports the inclusion of, and provides access to, BIBFRAME linked open data.
- LAC, as a member of the OCLC Canada Advisory Council (OCAC), will keep the Canadian library community informed about BIBFRAME and other linked data developments at OCLC.
- LAC will engage in communication channels to converse with the Canadian library community regarding the developing understanding of the BIBFRAME format and its implementation in Canada.
- LAC will share responsibility of French translation with other national institutions, which should include:
  - Actively participating in the translation of BIBFRAME elements into French.
  - Facilitating the creation, translation, and maintenance of linked data vocabularies in English and French.
  - Extending a standing invitation to francophone governmental agencies to share responsibility for BIBFRAME translation on an on-going basis and to join any future working group of francophone BIBFRAME users.

<u>CFLA-FCAB</u>

The Task Force recommends that the Cataloguing and Metadata Standards Committee of the CFLA-FCAB form an ongoing interest/working group to participate in national-level projects related to BIBFRAME. The working group would:
- Engage with CFLA-FCAB member associations to increase their awareness of BIBFRAME developments and encourage participation in projects related to BIBFRAME training and development.
- Collaborate with other national organizations such as LAC and FMD to share information on BIBFRAME.
- Collaborate with FMD to ensure that documentation and training materials related to BIBFRAME are available in French.

<u>Fédération des milieux documentaires</u>

The Task Force recommends that Section traitement documentaire et métadonnées of FMD forms an ongoing interest/working group to participate in national-level projects related to BIBFRAME. The working group would:
- Engage with FMD member organizations to increase their awareness of BIBFRAME developments and encourage participation in projects related to BIBFRAME training and development.
- Collaborate with other national organizations such as LAC and CFLA-FCAB to share information on BIBFRAME.
- Collaborate with CFLA-FCAB to ensure that documentation and training materials related to BIBFRAME are available in French.

Community Engagement

The Task Force recommends inclusive engagement with the Canadian library community and beyond regarding linked data at a broader level through the creation of a diverse interest group. Such a group could act as a venue to encourage:
- Inclusion of voices from the broader GLAM community.
- Inclusion of voices from communities such as LGBTQ2+ and Indigenous peoples, and other marginalized groups that emerge in the process of engagement.
- Fostering the advancement and implementation of "meaningful reconciliation as addressed by the Truth and Reconciliation Commission report and in [its] Calls to Action" and as guided in the [CFLA-FCAB Truth and Reconciliation Report](#).

Participation in Standards Development

The Task Force recommends Canadian library community collaboration with the CMSC to create a working group to participate in the development of BIBFRAME and other linked data schemas through, for example:
- Review of current BIBFRAME specifications.
- Exploration of the relationship of IFLA-LRM and the revised RDA Toolkit and how they represent library metadata within a linked data context, and specifically
  - The Task Force recommends inclusion of a BIBFRAME mapping within the RDA Toolkit (as was done for MARC).
- Consideration of how libraries can leverage linked data published in other domains, such as Wikidata and Schema.org, and how that linked data can interact with BIBFRAME.
- Encouragement of more active participation by Canadian libraries and Canadian library associations in the development and testing of BIBFRAME and other linked data based standards.

Community Support for Education and Professional Development

The Task Force recommends a pan-Canadian training program and community of practice be developed to help the Canadian library community prepare for a transition from MARC to BIBFRAME.

- The Task Force recommends that a BIBFRAME Readiness Primer or Checklist be developed to assist Canadian libraries in assessing their current state of readiness and to provide some recommended steps for a library to become better prepared for BIBFRAME.
- The Task Force recommends the formation of a core training plan, including identification of core competencies needed to transition to BIBFRAME, development of training materials that are both practical and scalable to different types of library settings, and production of a guide to best practices.
- The Task Force recommends inclusion of BIBFRAME in ALA-accredited Canadian library school programs.
- The Task Force recommends inclusion of BIBFRAME in library technician programs in colleges and CEGEPs.
- The Task Force recommends that the Canadian BIBFRAME Readiness survey be repeated in the next 2-5 years to measure the impact of awareness and education campaigns.

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