BIBFRAME Expectations for ILS tenders

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Forword

At the *European BIBFRAME Workshop 2017*[1] in Frankfurt in September 2017 the requirements for Integrated Library Systems (ILS) vendors to fulfil Linked Data model, with particular focus on BIBFRAME conformance, were discussed.

Based on this discussion the Organizer Group for the 2018 European BIBFRAME Workshop asked Tiziana Possemato to draft a specification about BIBFRAME Expectations for ILS tenders. During a dialogue between the Organizer Group and Tiziana, the draft is developed further into this specification. The aim of the specification is for libraries to use as a reference for invitations to tender.

The specification can be used for requirements for fulfilment of a specific level of service, asking the vendors to specify which and when their ILS system will fulfill some or all of them – or more openly just asking for a description of development plans.

Introduction

This draft document aims to define a list of possible requirements to be addressed by ILS providers in a tender. In this context, when we refer to an ILS we refer mainly (but not exclusively) to the cataloguing module.

In this document, we use 'system' to indicate the ILS (both terms are used here interchangeably).

These requirements are focused on BIBFRAME but, generally speaking, they refer to a more agnostic Linked Open Data environment.

The document is not intended to be exhaustive and detailed, but it serves the purpose of starting a discussion around the different stages of evolution of ILS in this transitional period between the old and the new ILS environments.

The proposed model can be seen as a sort of 'Maturity model'[2]. The list starts with an entry level item, defining a more traditional scenario, ending with a high level item, already in a future technological scenario (but already under construction). For each item, the Library should assign a score, used to evaluate the level of adhesion and of reception of the BIBFRAME specifications by vendors. This means that each library, depending on its nature, its mission, its type of user and so on, can choose which specific component to define as 'important' and can assign to them (or to it!) a score. The document proposes a sort of "building blocks", that can assume different values in relation to the specific library exigencies.

In this synopsis only general, basic information about the technology is provided. More detailed, complete information about the technological stack in different scenarios is required in a technical document. We refer to a database (a *relational database* as a traditional environment; *triple store/graph database* as linked open data environment) to indicate different scenarios; but the two different technological stacks are increasingly complicated compared to this

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[1] https://wiki.dnb.de/display/EBW.

[2] https://en.wikipedia.org/wiki/Maturity_model. Regarding the two different models proposed here (the Becker's and the Lahrmann's model) I'm referring to the second one, that is a bottom-up approach: "*distinct characteristics or assessment items are determined first and clustered in a second step into maturity levels to induce a more general view of the different steps of maturity evolution*".

simplification. In the diagram below, we give information about the *master/slave[3]* relationships between a traditional (RDB) and a linked open data (TS/Graph) environment.

When discussing the future of library systems, we should talk about Library Service Platforms, but this definition includes more complex aspects, not included in this first analysis of ILS expectations.

Before defining the requirements for a new ILS compliant with BIBFRAME the Library needs to clearly establish who is the end user that will use the linked data: should the project to publish or produce data in BIBFRAME be designed to be read by machines (to allow for reasoning processes, semantic indexing and so on) or people? This choice will determine the final specifications and dictate the direction of the project. In the case of a project designed for both machines and people, the specifications for searching/using data system become more complex, because the Graphical User Interface (GUI) needs advanced features to publish, show in a user-friendly way and use the RDF data. We have postponed this analysis for another time.

BIBFRAME conformance levels for ILS

The following levels of conformance can be classified in three different types:

a. Metadata generation/maintenance: levels 1-8;

b. Discovery: level 9

c. Documentation/future capacity: level 10.

Each one of these type groups can be improved in the future when more mature and clear requirements will be provided by libraries. This possibility relates above all to group b. and group c. (not so detailed in this document).

1. First level (entry level): the ILS needs to manage formats and be able to produce 'well-done' data (that means high quality MARC data), ready for conversion into BIBFRAME. The system is still in a traditional environment but the vendor has improved the cataloguing standard or the format to make legacy MARC records more conversion-friendly. Some examples of these features are:
   - the possibility to manage attributes and relationships useful to convert data into BIBFRAME;
   - the possibility to catalogue using RDA instructions and guidelines;
   - the possibility to manage and enrich MARC records with URIs;
   - the possibility to manage linking between bibliographic and authority records on the ILS level makes conversion much easier, since the system ensures the consistency of the links.

   In general, any functionality that improves data quality is helpful for conversions later on. In this scenario, the cataloguing module is totally record-oriented.
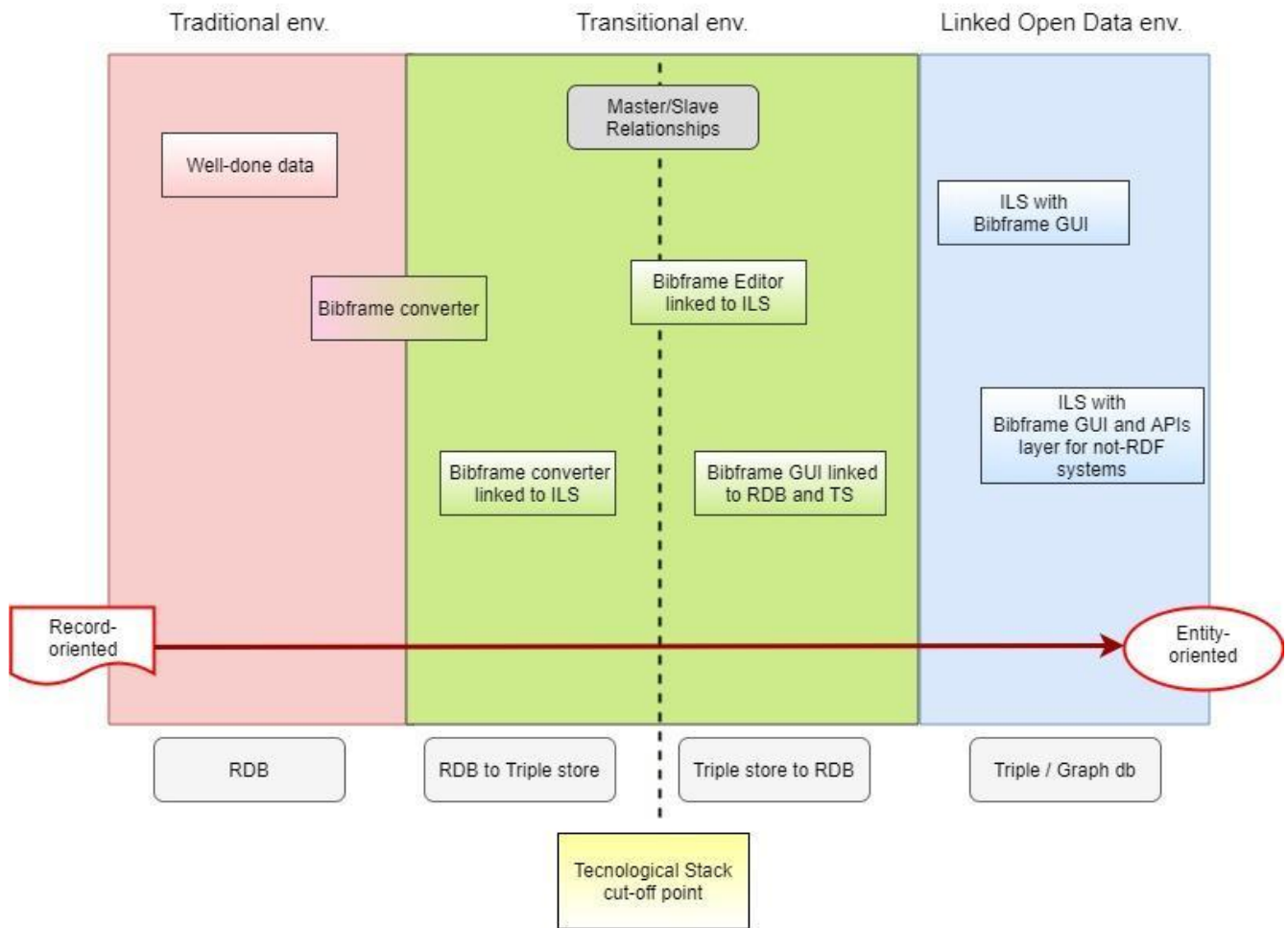
2. The vendor can provide a conversion tool able to convert to a variety of models including BIBFRAME (from MARC/MODS… formats to linked data), not included within the ILS but available to convert data. In this scenario, the cataloguing module is totally record-oriented, and the conversion into BIBFRAME is realized afterwards. The relational database is master respect to the triple store (slave).

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[3] Master/slave (technology): "is a model of communication where one device or process has unidirectional control over one or more other devices. In some systems a master is selected from a group of eligible devices, with the other devices acting in the role of slaves". Wikipedia, https://en.wikipedia.org/wiki/Master/slave_(technology).

3. The vendor can provide a BIBFRAME convertor connected to the ILS: this means that the massive data conversion is realized all at once, but the system should allow record-by-record updates of the RDF (BIBFRAME) dataset. In addition, the system should allow updates of data already in RDF format. In this scenario, the cataloguing module is still totally record-oriented, and the conversion into BIBFRAME is realized afterwards. The relational database is the master with respect to the triple store (slave). The two environments should stay aligned. This will make the data available as Linked Open Data to external applications for consumption.

4. The ILS facilitates the use of a BIBFRAME editor, to create and edit data in BIBFRAME. The vendor makes available an API layer to convert and download RDF data into the relational database (in traditional formats). In this scenario data become entity-oriented and they are converted into a traditional format to allow other services that use traditional data (for circulation and so on). In this scenario the master/slave relationship is determined by the 'editor' (it can have a storage system or not). This will make the data available as Linked Open Data to external applications for consumption.

5. The ILS has its own BIBFRAME interface (in the figure referred to as GUI), so that cataloguing is no longer record-oriented but entity-oriented. The system manages two different databases (relational and triple store) and each cataloguing action (post – edit – delete – get) updates at the same time in both environments. In this case, the Master is the triple store, and the slave is the relational database.

6. The system allows the original cataloguing to take place in RDF/BIBFRAME environment. The cataloguing process is totally entity-oriented (linked open data environment); the vendor makes available APIs/Web services to connect the system with traditional systems (to convert and manage data coming from traditional systems). There is no necessity to have a parallel, traditional environment, but the library wishes to remain in touch with the existing traditional environment.

7. The system allows the original cataloguing to take place in RDF/BIBFRAME environment. The cataloguing process is totally entity-oriented (linked open data environment), and it is likely that the entire ILS produces and manages data in RDF [or this may not be the case, however this scenario is not within the scope of this document]. There is no reason to have a parallel environment, because the transition to a new linked open data environment is completely realized.

8. The Vendor will ensure that the previously mentioned tools/technologies will take into consideration the BIBFRAME evolution; specific components will be updated absorbing changes in the BIBFRAME model and vocabulary, by … *[define a certain time, such as by one year from the publication of the new BIBFRAME version].*

9. The vendor will provide a discovery tool, which is able to give evidence to the entity-relationship model that BIBFRAME proposes. The details for an OPAC/Discovery BIBFRAME-oriented system would need another section of this document (or another specific document). In terms of the OPAC/Discovery tool, this list does not give a comprehensive outlook of the possible evolution of front-end systems. This level has not been considered a higher level of compliance but a lower level of compliance if included in requirements without previous levels.

10. The vendor must ensure the sharing of all project documents (technical and practical) to enable the management of the system in the future, outside of the exclusive domain of the vendor.

Diagram of Bibframe Expectations for ILS tenders

Bibframe Expectations for ILS tenders
How to evaluate the level of adhesion and of reception of the Bibframe specification by vendors

Traditional env.	Transitional env.	Linked Open Data env.

Master/Slave
Relationships

Well-done data

ILS with
Bibframe GUI

Bibframe converter

Bibframe Editor
linked to ILS

ILS with
Bibframe GUI and APIs
layer for not-RDF
systems

Bibframe converter
linked to ILS

Bibframe GUI linked
to RDB and TS

Record-
oriented

Entity-
oriented

RDB	RDB to Triple store	Triple store to RDB	Triple / Graph db

Tecnological Stack
cut-off point

Legenda:
RDB: Relational Database
TS: Triple store
GUI: Graphical User Interface