



# The Trove Metadata Manager Project

**MODERNISING THE ANBD FOR FUTURE LIBRARY SECTOR NEEDS AND BEYOND OUR SECTOR**

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**TROVE**  
**Partners**



Good morning everyone. My name is Brad Chugg and I am the Product Owner for the Trove Metadata Manager Project at the National Library of Australia. I am here today to talk about the major work which the National Library of Australia has been undertaking to modernise the underlying infrastructure of the Australian National Bibliographic Database (ANBD), the first since Libraries Australia was introduced in the mid-2000s.

We acknowledge the Australian Aboriginal and Torres Strait Islander peoples of this nation. We acknowledge the traditional custodians of the land and pay our respects to ancestors and Elders, past and present.

We are committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

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## What will be covered in this presentation?



Where have we come from?



Where are we going?



What have we learnt so far?

So as part of this presentation about the TMM Project, I will be covering 3 topics:

- How the ANBD came to be and where have we come from?
- Where are we heading with the TMM Project?
- What are our lessons learnt from the TMM Project so far?

# Where have we come from?

A quick recap

First off, it is good to recap the history of the ANBD, where have we come from, and how did we get here today which lead to the establishment of the TMM Project.

## History of the national service (up to 2005)

- Discussions of an 'online' system started early 1975.
- The 'Australian Bibliographic Network' was made available to the sector in 1981, powered by the Washington Library Network (WLN).
- Plans to replace the ABN started back in 1990.
- This was changed to Kinetica on 1 September 1999, which was powered by AMICUS from IBM.

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The concept for a national shared catalogue network at the National Library can be traced back to early 1970s, where NLA was wanting to emulate or even succeeded that which OCLC [then the Ohio College Library Center (OCLC, 2012)] had achieved (Cathro, 1991). Multiple reports were published by the National Library of Australia which analysed the feasibility of such a system, with study #2 in 1976 (National Library of Australia).

In 1981, the National Library of Australia made available the Australian Bibliographic Network (or 'ABN', not to be confused with Australian Business Number) to the broader Australian library sector on 2 November 1981 (having being used internally the years prior). The original service consisted of either a phone dial up per call, or metadata can be catalogued into certain terminals. Over time, the ABN Advisory Committee was established to provide advice to NLA about the path forward for the ABN.

Discussions around the replacement of the ABN commenced in 1990 as part of the ABN Business Plan for 1990 to 1993 (National Library of Australia, 1990). This was the result from the increased complexities around the Washington Library Network (WLN) application plus the customised modules NLA had implemented. Whilst there were initial plans to have a system co-developed with the New Zealand Bibliographic Network (NZBN) through the World 1 project (National

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Library of Australia, 1995; National Library of Australia, 2009, 23 October), changes in strategic requirements by the National Library of New Zealand resulted in the two institutions going their separate ways.

- Changed from Kinetica to Libraries Australia in 2005, powered by CBS from OCLC.
- In January 2009, automated syncing of holdings to WorldCat started from the ANBD.
- In July 2019, Libraries Australia membership changed over to the new Trove Collaborative Services membership.
- First OAI-PMH Library went live in December 2019



In 2005, the ANBD swapped over from being powered by AMICUS and branded as Kinetica to being known as Libraries Australia and powered by *Centraal Bibliotheek Systeem* (Dutch for 'Central Library System' (OCLC, 2021), normally called CBS) which is provided by OCLC.

2009 saw the National Library of Australia, through the ANBD, become the second union catalogue in the world to implement automated holdings updates to WorldCat, with the first union catalogue being the Dutch Union Catalogue (National Library of Australia, 2009). This was done through the SRU (Search/Retrieve via URL) protocol which enables near-real time communications between systems and transmits data in an XML-based format (McCallum, 2007), like that which we currently harvest using the OAI-PMH protocol.

As part of experimenting with the NLA Harvester tool which had been used with Trove, it was also experimented on to test the viability of a library's holding and bibliographic data being contributed through the NLA Harvester using the OAI-PMH protocol (an XML-based scheme) opposed to uploading via FTP into the Record Import Service (RIS). This was trailed with Sydney Mechanics Institute School of Arts and the harvest stream went live in December 2019, paving the way to the current (Atkinson & Hickie, 2022).



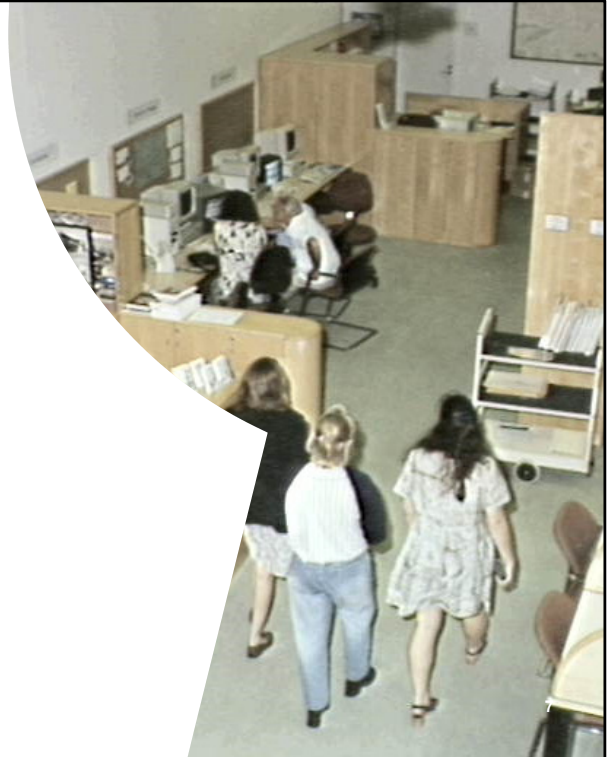
## What makes the ANBD Unique?

### ■ A unique union catalogue in a unique part of the globe

- Most partners catalogue locally then upload to the ANBD
- It also serves as the National Bibliography
- Powers other systems (such as Trove and LADD)
- Electronic legal deposit (NED) is integrated into the ANBD
- We do not enforce a specific language for metadata description
- Metadata is also pulled from other foreign catalogues

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When comparing the ANBD to other union catalogues or national catalogues, it is extremely unique in how it has been setup)

The first means is that majority of Trove Partners who contribute to the ANBD do not catalogue directly into the ANBD. Whilst other union catalogues (such as the Program for Cooperative Cataloguing in USA and Libris XL in Sweden) have users cataloguing metadata into a central system, majority of Trove Partners will catalogue in their local systems and have the metadata harvested and loaded into the ANBD. This contribution then goes through a match and merge process and a combined record is generated and outputted to Libraries Australia and Trove.

Another unique aspect is that the ANBD also plays the role of the National Bibliography, supporting the development and publication of lists of Australian Publications (such as the *Recent Australian Publications* currently published on Trove (<https://trove.nla.gov.au/recent-australian-publications>)). The Australiana records are also utilised by other organisations, such as the National Library of Australia, to advise and support acquisition activities to capture the role

The ANBD is also heavily integrated and powers other systems, such as Trove and the current Libraries Australian Document Delivery (LADD) system, to enable information to be shared with the broader public.



The way in which the ANBD works with electronic legal deposits through NED is also unique in that it is heavily integrated, with metadata being first pushed to the ANBD before it appears on NED member catalogues through other systems. Other countries are exploring this approach, such as Sweden (Personal communications with National Library of Sweden, December 2023).

Australia is a multicultural society, and the ANBD is no different to this approach. We do not enforce or mandate that records need to be catalogued in specific languages. This was a result of the amalgamation of the ANBD and the Chinese, Japanese, and Korean bibliographic database, formerly stored in separate databases prior to Libraries Australia.

Finally, to support the library sector with copy-cataloguing activities, the NLA also purchases a wide range of metadata records from major providers (such as Library of Congress and The British Library) to let libraries to download into their local systems.

## The current pain points

- Match and Merge has been over-engineered and is difficult to sustain
- Match and Merge workarounds is hitting its limits
- Primary means for ingest through RIS has rate limits
- The technological ecosystem has become overly complicated
- Extensive staff time is required to support and maintain the system (Trove Partners, NLA, and vendors)
- Systems are not ready for future technological enhancements

Which such a unique system that has been performing without major significant changes since mid-2000s but people's information needs have evolved, pain points are currently becoming more and more noticeable.

One noticeable pain point is the Match and Merge currently used for metadata being contributed to the ANBD. Each record contributed currently employed go through many, many match and merge checks, with each format having their own set of rules for match and merge. This started to cause issues with the ingested records overlaying on the incorrect records and causing bad merges. Because of this, a workaround for Trove Partners contributing through the NLA Harvester were developed to implement a simpler identification of the best candidate record in the ANBD if one exists, or creates a record when one does not exist. However, this has recently started to create issues where the custom query calls (which is to Libraries Australia Search) fails depending on the length of the query string due to us starting to ingest more archival materials and the age of the SOLR application which Libraries Australia Search currently sits on.

The Record Import Service (RIS) is a central component to ingesting records into the ANBD and was developed in-house by the NLA. No significant upgrades have occurred to RIS to handle greater number of records being ingested simultaneously from different data sources. Because of this, when we are

onboarding a new partner to the NLA harvester who have millions of records, RIS will slow down drastically, delaying updates to the ANBD.

The Trove and Libraries Australia ecosystems have an estimated 58 applications which supports the running of Trove and the ANBD. This number has arisen as we integrated independent systems to each other to provide a 'seamless-ish' experience for our users. However, this does mean it is extremely complicated and costly to maintain.

As a result of these, there is extensive staff times from NLA staff, our vendors, and our Trove Partners in troubleshooting, escalating and resolving issues as they arise. This time lost is taken away from enhancing the services and experiences of our key stakeholders and information users, the Australian people.

Technology and the internet has also evolved from the mid-2000s and is not reflective with how people (and machines) consume and read information. Some key points of what people had to consider back in the mid-2000s:

- People arguing over using the internet or the phone
- Didn't need to make coffee whilst waiting for a page to load for those on dial-up
- Social media was not a thing (no Facebook, no Twitter/X, no YouTube, but there was MySpace)
- Internet download limits were at the forefront for most internet users
- AI and machine learning was relegated to dystopian stories, movies and video games

Back when Libraries Australia was also implemented, it is important to remember these events had not happened:

- The 2005 Cronulla Riots (December)
- COVID-19 pandemic
- Victorian Bushfires
- The 2008 Global Financial Crisis
- The decade of revolving prime ministers
- The NDIS
- The transition to RDA from AACR2



With this in mind, we now come to the Trove Metadata Manager Project being undertaken by the National Library of Australia.

## Aims of the TMM Project

- Replace third-party solution with in-house application for match and merge
- Replace current cataloguing tools with a single Web Cataloguing tool
- Maintain dataflows between systems (NED / Trove / Libraries Australia / WorldCat)
- Design the system to enable it to be a single data store in the future

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The TMM Project has several aims to support the ongoing sustainability of the ANBD. The first one is to replace some third-party solutions with an in-house application for match and merge and to store the data before pushing out to Libraries Australia and Trove. Developing an in-house application for the ANBD is not a normal option nowadays, however it was necessary to meet the unique needs of the ANBD.

We will also need to replace WinIBW/LACC/CatClient, Add Record page and the LA edit holdings page with a new application. We will be developing a web-based cataloguing tool to enable Trove Partners to add and update their contributed records to the ANBD. The new tool will also be developed to ensure that libraries and cataloguing professionals can create their detailed records (if that is what they want), whilst enabling the broader GLAM sector

The project will also work on maintaining dataflows between several significant systems where data is pushed to. Of note, these include:

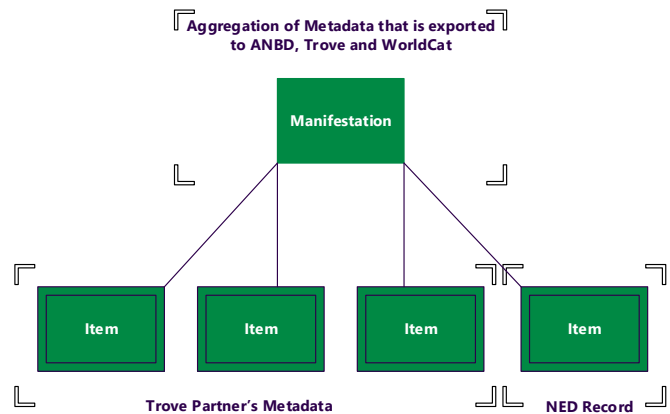
- National edeposit (NED)
- Trove
- Libraries Australia
- Other external systems (such as WorldCat and VIAF)

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With the sharing of metadata between systems, the underlying datastore has also been designed so that it can act as a single data store for most metadata within the Trove Ecosystem. This future work will enable NLA to further reduce the complexities and applications required to drive Trove.

## Aggregating our metadata

- New solution will provide an aggregation of metadata contributed by Trove Partners.
- The aggregated 'manifestation' record is based on merge rules developed specifically for the ANBD.
- The items will be what the Trove Partner contributed *plus* data normalisation and enrichment activities by NLA.
- NED will have priority over specific fields (such as those which denote access details).



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Currently within CBS, NLA has it configured so that there is only a single record and we do not retain a copy of Trove Partners' contributed metadata. This has presented issues for when records go through a bad merge or become corrupted, as there is no 'undo' button and require staff time to manually recreate the record.

Going forward in the new system, the new system will keep a copy of the metadata which is received from the Trove Partner then generate a Manifestation record based on the metadata contributed by the Trove Partners, through an automated match and merge process,. This will be records received through the new WebCat tool *or* records received by the Trove Partner and gone through a process of normalisation and enrichment through the NLA Harvester. If NLA need to undertake changes to how match and merge works and go through a regeneration process, then we can do that without needing to reharvest all Trove Partner's metadata.

Records will also continue to flow directly in from NED. With this, there are certain fields which only NED records will be able to update such as access control information. This is to ensure that NED processes and workflows do not break, but still enabling enrichment activities into the union catalogue from other Trove Partners.



## Expanding into the broader GLAM sector

### How to keep the granularity of library metadata, but enable different metadata from galleries, archives, and museums?

- What can be used to easily identify Australian metadata?
- What will work best with RDA Official in the future?
- What will support Trove's future sustainment?

The decision...

Implement a linked data solution, adapting BIBFRAME to our context through the Trove Ontology

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Under the Trove Strategy, there is a focus on expanding the Trove Partnership base, particularly into the Gallery, Archive, and Museum sectors (National Library of Australia, 2022). *Revive* also sets out the strategic aims from the Australian Government on the cultural policy for the next 4 years and initiatives for several the National Cultural Institutions (Commonwealth of Australia, 2023).

It was identified early on that if we were to successfully realise the expansion into the broader GLAM sector, then we would need to look beyond the MARC21 format for storing the metadata we receive from Trove Partners. From this, there were some key questions that were asked:

- What is available to support granularity of metadata libraries are used to, but enable different descriptions methods by galleries, archives, and museums? Continuing MARC21 will disenfranchise non-library partners, but having data stored in base Dublin Core doesn't meet the needs of the Trove Partners.
- The National Library of Australia collects and describes materials which describe Australia's history, culture, and stories (cumulative of over 60,000 years). There also has been an eventual shift of how the library sector describe resources and information, particularly those of First Australians origin. So we need to be able to identify these records and description formats.
- Looking forward, RDA Official will be introduced in Australia by 2027 and is a

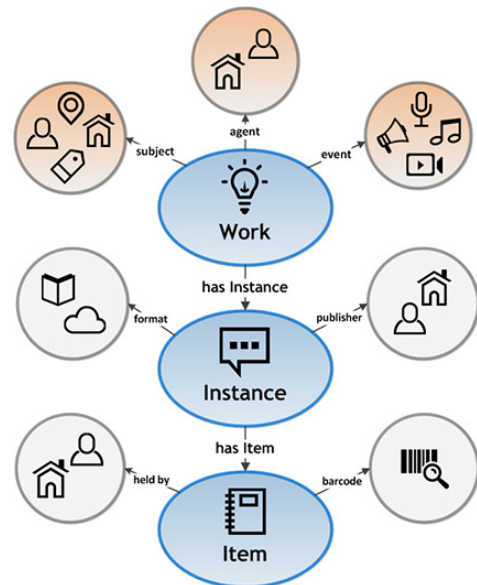
significant change to how we describe resources in the metadata since 2013. Because of this, what format will be better positions to handle the various ways in which a cataloguer can use RDA Official?

- Trove is Australia's cultural resource, sharing what is held in hundreds of organisations (including NLA) and exposing it for the Australian society and beyond to connect people to past stories. The ANBD is one of the significant data stores which Trove relies upon, which allows the public to find resources held in institutions. This led to the question around what do we need to do as part of this project to support the ongoing sustainment of Trove into the next 10 to 20 years.

With these questions and after undertaking the research, looking at the trend in the library sector in Australia and globally, and following a meeting with the National Library of Sweden, it was decided that the new system will be built to better support linked data, adapting what Library of Congress have done with BIBFRAME and expanding it to meet the Australian GLAM sector needs through the Trove Ontology.

## Rationale for going down the linked data route

- MARC 21 is a library-centric standard, based on ISO 2709:2008 and originally a format to move from card cataloguing to computer cataloguing
- The linked data pathway will enable future work and technologies to be incorporated into Trove (such as AI and machine learning)
- It enables Trove to be readily available for additional formats going forward.



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The decision to go down the linked data pathway for the TMM Project was done to support the future sustainment of Trove as Australia's sovereign cultural resource. In considering the questions that we were asking ourselves, there were some main points that became apparent through internal discussions and research across the global library sector. I have also included the BIBFRAME model from Library of Congress to the right for people to see the model. We have been working internally on an updated model to consider Hubs and how we approach things in Australia.

The first is to remember that the MARC standard has been in existence since the late 1960s to support the sector in the transition from card cataloguing to computer cataloguing, formulating in the first edition of ISO 2709 in 1973. MARC 21 was created in the late 1990s through the amalgamation of CANMARC and USMARC and has evolved since then. The development and release of RDA in 2010 saw a significant shift in how we describe our materials, however the full realisation has been limited to what MARC21 can allow.

It was identified in 2008 that Library of still observed today with the Internet of Things and Artificial Intelligence. The semantic web and linked data has come up a couple of times over the past 20 years, however it is of prominence nowadays with governments and institutions working with extremely large data sets. MARC

as a format was never designed to work with linked data and, whilst there has been some conversations through distribution lists in the US about this, the MARCXML format is also not designed for this.

The linked data pathway will also enable us to work towards on incorporating current and future technologies into Trove down the track, such as Artificial Intelligence and Machine Learning. These technologies will assist us in improving the experiences of Trove users in Australia and globally, but also ensuring that we respect copyright and cultural rights to materials available in Trove.

## What still needs to be done?

- Continue work on match and merge in linked data based on the Trove Ontology
- Exploring and defining conversion works between other formats (such as authorities, EAC-CPF, EAD 4.0, and Dublin Core)
- Development and refinement of WebCat (with feedback from the TCS Metadata Technical Working Group)

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We still have some work to do as part of the TMM Project ahead of us.


Firstly, we are exploring how match and merge will work within a National Union Catalogue based on the Trove Ontology. This is an unprecedented activity as match and merge in BIBFRAME has not been attempted to a complex level required for the ANBD.

Another thing we need to do is, as part of developing the system as a single data store, explore how can we crosswalk the Trove Ontology into other metadata formats used by the GLAM sector. These include MARC 21 Authorities, EAC-CPF, EAD (including the upcoming 4.0 release) and Dublin Core.

We will also be developing and refining the WebCat tool for use by the sector. To support this, we have the TCS Metadata Technical Working Group which we consult with on the WebCat and for them to undertake user research activities by one of our project team members. We are also planning on ways in which we can engage the broader community, closer to the release, to expose webcat to cataloguing staff and to capture their feedback.

## What will we notice about the change to BIBFRAME?

- It will only be noticeable through web cataloguing tool for those partners who catalogue through it
- Issues with descriptions in catalogue records will become more noticeable in the ANBD and WebCat
- URIs will start appearing in records as needed in the ANBD

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When changing metadata formats, there are inevitably changes which people will notice, with this shift being one of those.

It is important to note that you will only notice BIBFRAME/Trove Ontology through WebCat. WebCat is being designed as an online tool, where a user enters the data into fields (opposed entering each MARC field manually). There is no requirement, however, for someone doing cataloguing through WebCat to be able to read the data output (which will be presented in XML).

An issue which will become more apparent is when people do bad cataloguing and upload incorrect things or mistakes to the ANBD. It is important to note that the ANBD is a National Union Catalogue where over 800 Trove Partners can contribute to it. For this to be cleaned up, it does need to be a collaborative effort across the sector to ensure information is right in local systems, so they appear right in the ANBD.

Another thing which we will notice is that we will start seeing URIs to appear in records outputted to the ANBD. These URIs will link certain data to the source repository, supporting institutions to move towards linked data when they are ready.



## What is the TMM project *not* doing?

- **NOT** Decommissioning Libraries Australia Search
- **NOT** Changing metadata format in Libraries Australia search
- **NOT** Abandoning MARC21

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There are some things to also reinforce which the project is not doing to dispel some rumours which have been circulating.

Firstly, we are not decommissioning Libraries Australia Search as part of the project and we will continue to provide web solutions for Partners to access and download detailed metadata for their needs. Libraries Australia Search is being **upgraded** to a supported version of SOLR, which can return more refined results of records based on internal testing.

Libraries Australia will continue to display metadata in MARC 21 to support library activities. We will continue some of the MARC 21 localisations to support current workflows and interlibrary lending activities.

I also wanted to reinforce that we are not abandoning MARC 21. We have taken the lead to work with linked data to ensure that we are ready for when our Trove Partners are ready to make the shift away from MARC 21, as many ILMS vendors have begun exploring how they can support customers on working with linked data, particularly BIBFRAME.



# What are the lessons learnt so far?

It is always good to regularly reflect

## On the TMM Project

- Communications is critical
- Opportunity to engage Library of Congress on updating codes used in MARC21 in Australia
- Need to anticipate upcoming events and activities in the sector for the next 5 years and what needs to be done now or later
- This is the biggest change in 20 years to the ANBD.

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With the project, we do have some lessons learnt which I wanted to share with everyone today.

The first thing is that communication is critical for the project to support the change management activities for both our internal staff and external stakeholders. The change which we are doing is massive for our sector and for our Trove Partners and it is important that we bring people along for the journey.

The project also presented opportunities for us to work with Libraries of Congress to update codes which we have registered with them. This is important when moving into the linked data space, as they are the main institution which maintains all the MARC Codes which will appear in the linked data records. This has ranged from updating organisation codes registered with them to registering Australian subjects and terms thesauri available. We have also done internal works to harmonise some of our practices, such as the approach to assigning 'anuc', which is a code to identify Australiana materials and is used to support the development of the National Collection at the National Library of Australia.

As part of this project, there has been a lot of forward planning into the future to anticipate some of the strategic changes inbound for our sector. These changes which have influenced these have included the eventual changeover to RDA

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Official within Australia, future works for improving Troves Sustainability as part of the Trove Strategy and a broader roadmap and applying capabilities for us to support the ICIP implementation at the NLA.

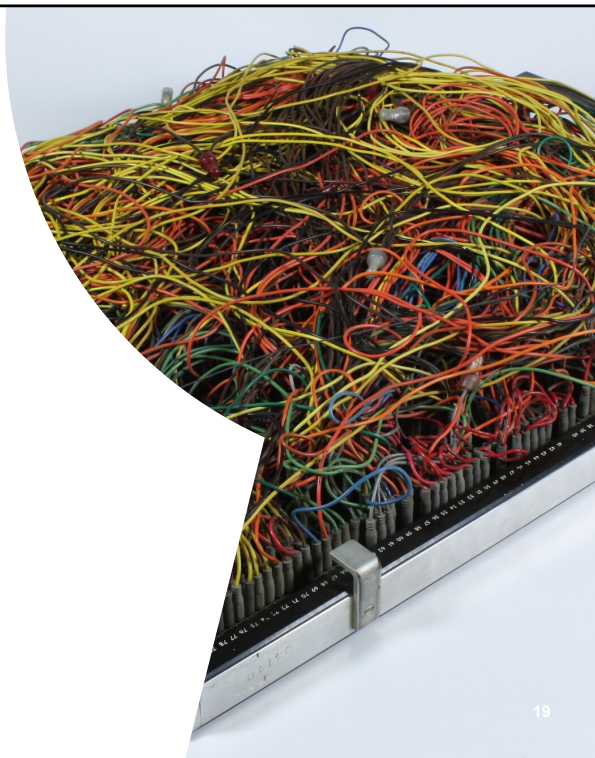
Finally, this is the biggest change which the National Library of Australia have done to the ANBD since the introduction of Libraries Australia as the replacement to Kinetica, further added to with information sharing futures for interlibrary loans. Whilst the Libraries Australia was originally designed to be modular, there has been increasing interdependencies on other systems over the 20 years.

## On adopting BIBFRAME

- MARC 21 to BIBFRAME conversion published by Library of Congress is focused on their requirements
- BIBFRAME is continually evolving, but has dependencies on ongoing MARC 21 development
- Need to continue working with MARC 21
- Networking internationally leverages off lesson learnt not available in the scholarly domain
- The ANBD and Trove have specific requirements not found elsewhere globally and needs to be reflected in the Trove Ontology

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So far in the project, there has been several lessons learnt on what people need to think about when wanting to make the jump.

The first one is that Library of Congress have published their conversion specifications from MARC 21 to BIBFRAME and then from BIBFRAME to MARC 21. In unpacking these, it has become evident that these conversions are specifically what Library of Congress require for their transition from MARC 21 to BIBFRAME as a single institution. Because of this, we needed to adapt the changes for what we required in the National Union Catalogue

Like many things within our sector, BIBFRAME itself is constantly evolving. However, as libraries continue to rely on using the MARC21 format to describe their materials and because of this, BIBFRAME needs to also march in line with MARC 21 development. This is evident when reviewing the recent MARC Advisory Committee Meeting papers, where there are sections about BIBFRAME changes on each of the proposals for changes to MARC 21.

We had the advantage of networking internationally with Libris XL staff at the National Library of Sweden, who had done the shift from MARC 21 to BIBFRAME in 2018 as part of a project to replace Voyager. What they discussed was that it is a long-term transition for their sector, something which is also anticipated for

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Australia.

# The references and citations

For those who like to do a little bit more digging

Here are the references used to support the development of this presentation. If you would like to read into the information in more detail

I've also included citations for the images used throughout the slide.

## Image citations

Slide 1: Chugg, B. (2023). *National Library of Australia* [Photograph]. Flickr.  
<https://www.flickr.com/photos/bradchugg/53030881534/in>. All rights reserved, reused with permission.

Slide 3 (Left): *Bess Thomas, Chief Librarian Mosman Library, 1946 – 1952* [Photograph]. (n.d.). Mosman Council, Sydney.  
<http://images.mosman.nsw.gov.au/?code=MjA1OTM=>

Slide 3 (Middle): *An Australian forward observing post in France* [Photograph]. (1918). Australian War Memorial, Canberra.  
<https://www.awm.gov.au/collection/C1015358>

Slide 3 (Right): University of Queensland Jazz Club (n.d.) *A night at the Jazz Club* [Poster]. Retrieved 25 March 2024, from  
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Slide 5: Sutton, B. (n.d.). *1983 Williamstown Library Junior Catalogue* [Photograph]. Picture Victoria.  
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Slide 6: University of Wollongong Archives. (n.d.) *Library Catalogue* [Photograph]. Flickr.  
<https://www.flickr.com/photos/60392191@N04/5513086849>. CC BY-NC-SA 2.0.



## Image citations (cont.)

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Slide 12: Swinburne University of Technology. (1996). *Developing Leadership Teams Project, 1996*. Swinburne Commons, accessed 3 April 2024, from <https://commons.swinburne.edu.au/items/f74f6216-d662-4fc0-bbd9-9c2161d796b3/1/>. [CC BY-NC-ND 3.0 AU](#).

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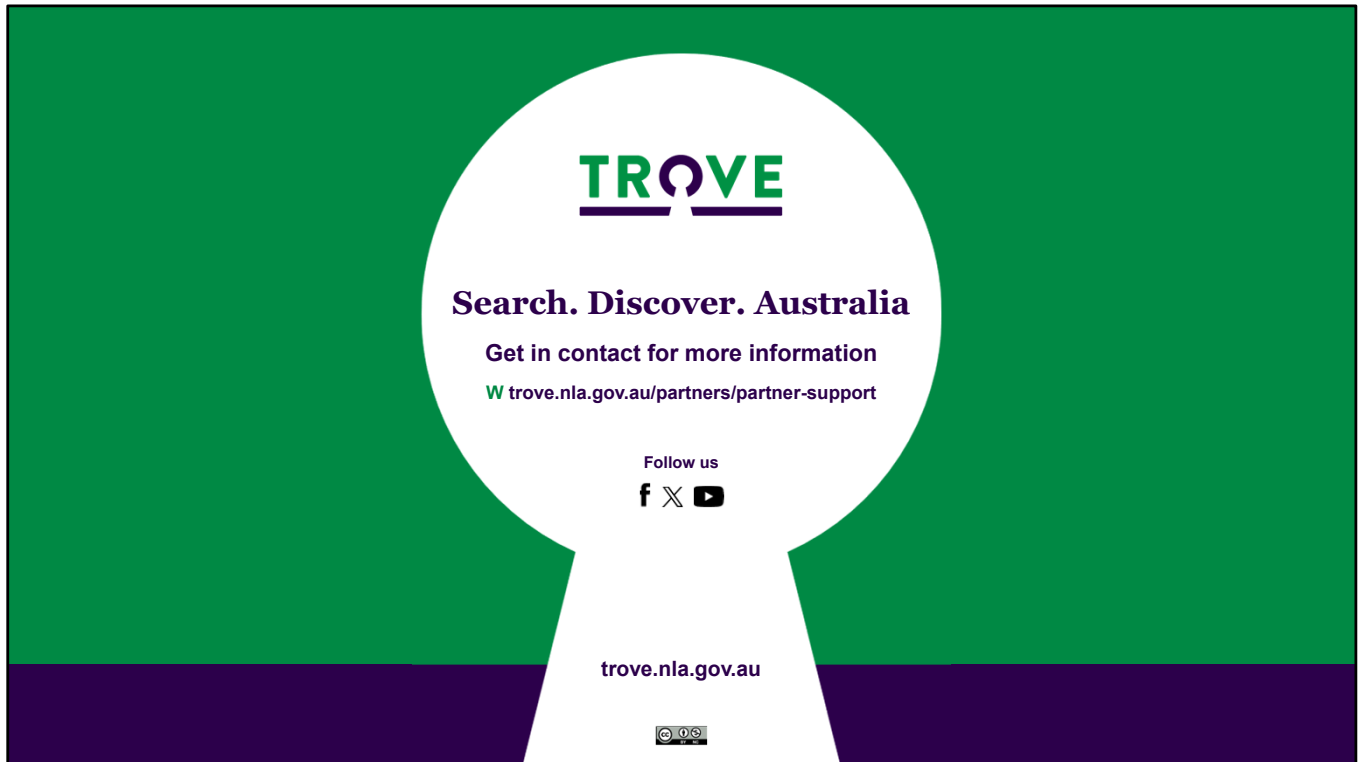
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Thank you for coming today and finding out what we are doing with the ANBD with the Trove Metadata Manager Project.

[Question Time]

[After question time] Thank you again for today and the questions. I will be around the Trove stall for this afternoon (and will be around Thursday and Friday), so you are welcome to come and ask any other questions that you might think of after this presentation. Otherwise, you can put in a question through the Trove Partner Support page if something pops into mind after this conference

We will also be uploading a copy of this slide pack to the Trove Presentation and Workshops page, so people can freely access this presentation.