Persistent Identifiers
at the National Gallery

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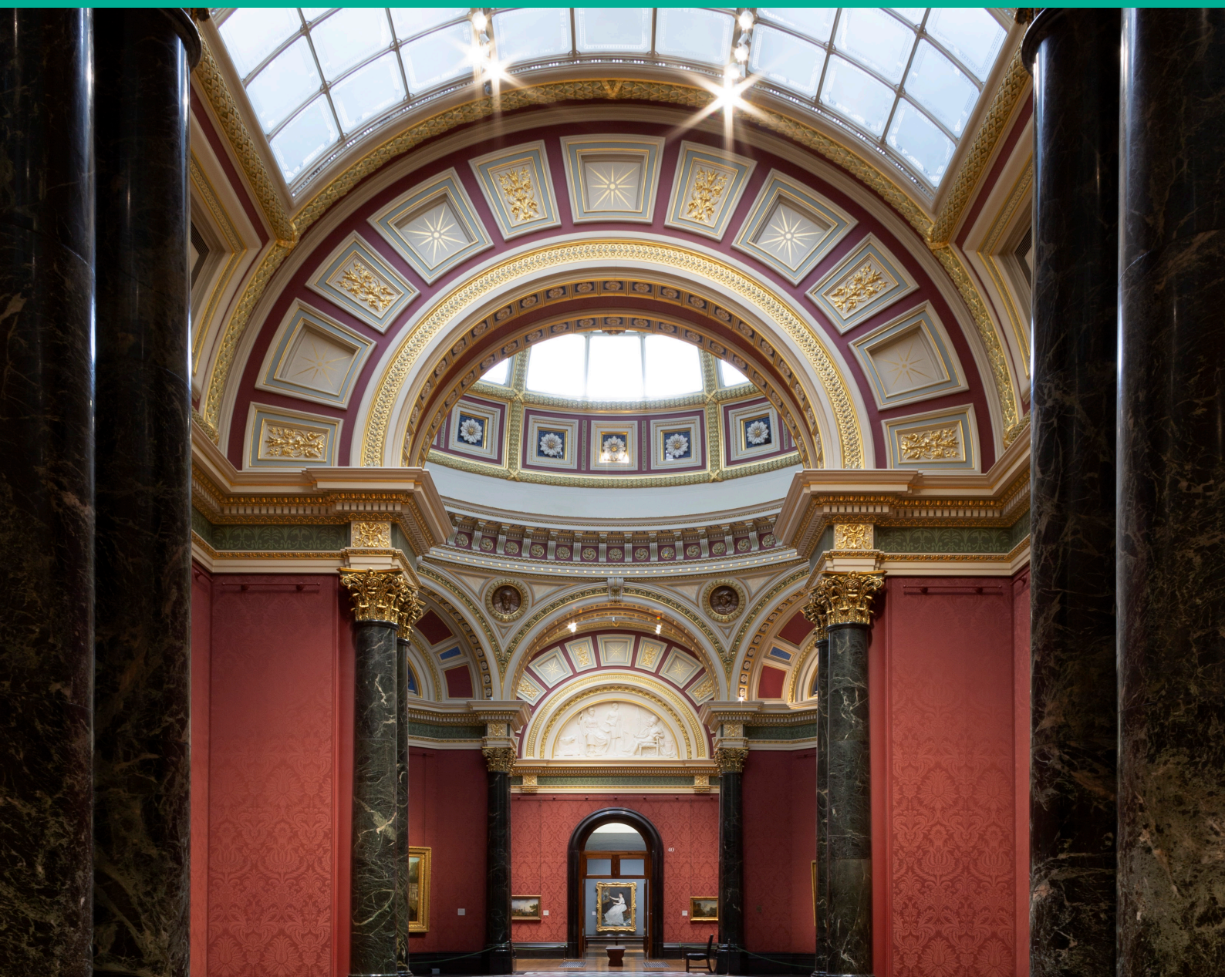

An output of the Persistent Identifiers as IRO Infrastructure project

Arts and Humanities Research Council
TOWARDS A NATIONAL COLLECTION
BRITISH LIBRARY
SCIENCE MUSEUM GROUP
NATURAL HISTORY MUSEUM
V&A
THE NATIONAL GALLERY
Royal Botanic Garden Edinburgh
University of Glasgow

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Executive Summary

The National Gallery has conducted exploratory work related to persistent identifiers (PIDs) over the last number of years. This work has led to the development of a beta PID system based on URIs that is now transitioning to a production system. This case study provides an overview of their implementation and lessons learned through it. The National Gallery is home to the UK's national collection of paintings in the Western European tradition, comprising 2,300 paintings. It also houses additional material including a 'History Collection'; samples relating to paintings both within and external to the Gallery; a collection of digital images and frames; and library and archive collections.

Within the context of this case study, a PID is an identifier that is globally unique, actionable (it can be resolved to a resource or information about a resource), and where it is managed to remain unique and actionable for the long term. The systems that create, maintain and hold these identifiers are referred to as PID infrastructure.

Background

The National Gallery looked to persistent identifiers as a way to persistently connect information between its various systems. The National Gallery's main collection identifiers are inventory numbers but these are not persistent, are subject to change and not resolvable on their own in any way, i.e. they cannot be expressed as a URL or are not machine actionable. Some systems used by the Gallery use bespoke system numbers, but these are not necessarily persistent or interoperable. Inventory numbers are held in the Gallery's collection management system, TMS.[1] TMS can also hold external identifiers for entities such as Wikidata[2] identifiers and Getty Unified List of Artists Names[3] (ULAN).

Through various externally funded projects the Gallery developed a beta PID system, based on Linked (Open) Data dereferenceable URIs. These IDs can then be fed back into TMS and could be presented via an API in different ways or formats including JSON or XML. The IDs could also be incorporated into the Gallery's IIIF system.[4] While the system was developed through external funding it was done using only one staff member.

Production Service

The production PID Service is a component of a wider middleware solution which allows entities from across the Gallery's main collection, associated authority files, bibliographic references, and its library and archive collections, to be surfaced through numerous access points. The middleware solution is an open source software called Collection Information Integration Middleware (CIIM) developed by Knowledge Integration. The Gallery procured this solution and it is being implemented by Knowledge Integration, with a small internal project team. This work forms part of an ongoing programme to standardise and improve the Gallery's collection information and increase the amount of that information it makes available online.

The PID is a core part of the solution as it connects entities between systems and will be used when outputting the information in a range of formats. This will reduce the complexity of maintaining the Gallery's systems and make it easier for systems to be adapted and changed as only the integration with the middleware will need to be updated. It will also provide the

[1] Gallery System's The Museum System https://www.gallerysystems.com/solutions/collections-management/

[2] https://www.wikidata.org/wiki/Wikidata:Main_Page

[3] https://www.getty.edu/research/tools/vocabularies/ulan/

[4] International Image Interoperability Framework https://iiif.io/

capacity to include further scientific and conservation data within the system, increasing the visibility and capacity for research around the collection.

The solution will also ensure that all of the access points to information about Gallery resources, e.g. internet pages or the intranet, will have consistent automatically updated information across them. By making the collection information available via the CIIM, it will be possible to present information on the Gallery's website in a more flexible way. Information about the paintings can be curated in different ways and media presented in different formats but robust persistent links to the core collection information can be maintained easily (see Figure 1). It will also be possible to automatically update links between collection items, authority files and bibliographic references, reducing staff time and errors in the data.

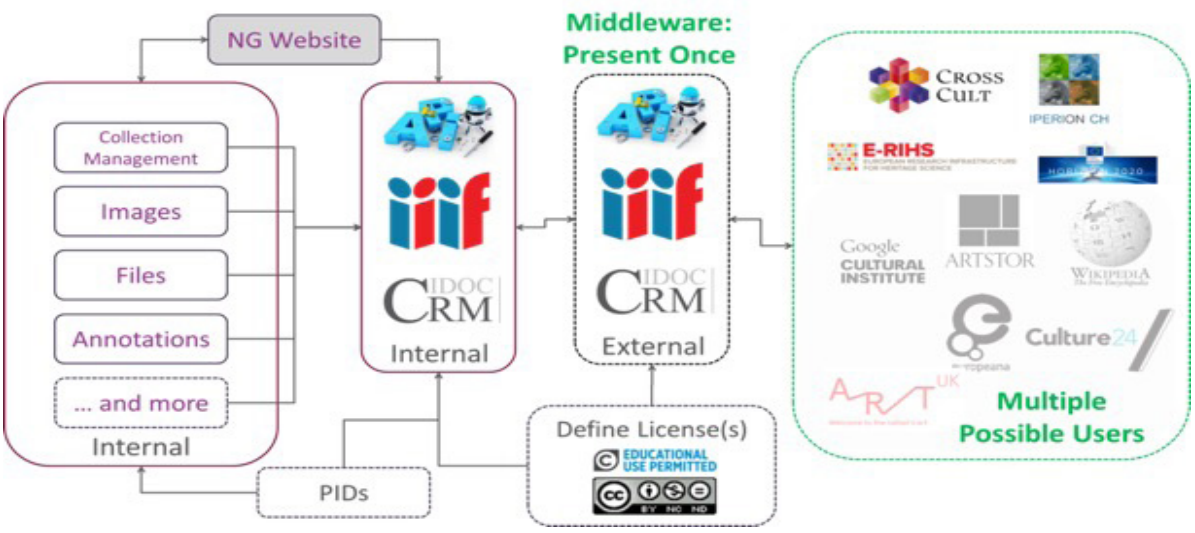

Figure 1: Schematic of the National Gallery's service.

It is anticipated that the amount of additional data, such as Wikidata identifiers and Getty ULAN that can be harvested automatically into the system will increase. It will also be possible for other services such as Art UK, Europeana and Google Arts and Culture to update their information automatically from an endpoint connected to this middleware rather than via manually generated spreadsheets.

This system introduces great potential to connect and link data robustly but the concurrent improvement and standardisation of the Gallery's collection information increases this benefit vastly. The system is not yet fully implemented but is part of the Gallery's business as usual service commitment and needs to be maintained both financially and with staff time.

Future Plans

The initial production PID service will provide a vital step forward in integrating and cohesively implementing identifiers across the organisation. There are also forthcoming plans to convert the information from the Gallery's published catalogues and publish them as web pages. These will be enhanced and edited over time so the Gallery will need the capacity to manage versions with PIDs and maintain the relationships between them easily. Other gaps in the coverage of identifiers will remain following this initial implementation, for example, there are other entities that could have identifiers assigned, e.g. records in the research database of samples, and these will be added in due course. The current implementation does not comprise a globally resolvable component and this will need to be considered in the future.

Conclusion

The National Gallery is still in the process of implementing its PID service; however, it is clear on the potential benefits that can be realised through it. By utilising PIDs through a middleware solution the Gallery easily realises one of the major benefits of using identifiers to connect and link data across systems and provide both internal and external users real time, accurate and detailed data when it is needed in the format desired.

Other organisations could adopt a system either similar to the beta system developed by the Gallery in house or procure a solution externally such as the CIIM. However the benefits of this production solution and its potential is increased by the Gallery's investment in improving its collection data and commitment to making it available externally. The relatively small size of the Gallery's collection has made this detailed improvement possible which may not be true of other collections.

Introduction

This case study provides an overview of how persistent identifiers (PIDs) have been implemented at the National Gallery including lessons learned and the opportunities these present. An initial beta implementation is transitioning to a production service as part of a wider project to enhance and improve the organisation and presentation of collection information. The PID service will allow for resources across disparate systems to be connected robustly and surfaced to a range of audiences and meeting various use cases.

About the National Gallery

The National Gallery houses the UK's national collection of paintings in the Western European tradition from the 13th to the 19th centuries. Its core collection comprises approximately 2,300 paintings. In addition to this main collection, it also holds a 'History collection' of other works of art related to the main collection; samples relating to paintings both within and external to the Gallery's collection; a collection of digital images related to its holdings; a frame collection; a library collection of approximately 100,000 items; and archive collections including public records of the Gallery and private individuals, comprising millions of individual items in total. In addition, the Gallery has an extensive research programme which covers various aspects of the Gallery's collection and the wider study of Old Master paintings.

Persistent Identifier - Definition

Within the context of this case study, a persistent identifier is an identifier that is globally unique, actionable (it can be resolved to a resource or information about a resource), and where it is managed to remain unique and actionable for the long term. The systems that create, maintain and hold these identifiers are referred to as PID infrastructure.

Persistent Identifiers at the National Gallery

Background

For the past decade there has been an internal drive to connect the information held across the National Gallery's diverse systems, from curatorial information to scientific analyses and conservation details. There is also the aspiration to connect the Gallery's information with external resources.

The National Gallery has an internal API which allows some of these internal sources to be connected together including paintings, images and samples. The Gallery uses a small selection of different types of inventory number as the main identifiers for its collection to achieve this. However, they can not always function as a "persistent" identifier, which has implications for its use in linking across systems. For example, each type or class of inventory number defines an object's status as well as its type. This means the inventory number changes when the status of an object changes, for example when a long term loan is purchased its inventory number changes from an "L" number to a "NG" number. These inventory numbers are also used as part of naming conventions, when identifying digitised images related to a given painting; and therefore image filenames can also be subject to change when inventory numbers change. On their own, this sort of simple inventory number, is also not resolvable in any way, i.e. they cannot be expressed as a URL or are not machine actionable for external use.

These inventory numbers and other core information are held in the Gallery's collection management system, TMS.[1] Other identifiers in use at the Gallery are linked with the database in which they were created and held, the archive system Calm[2] and the library system Eos[3] both have their own system numbers. Again these identifiers are not necessarily unique, not resolvable and are subject to change if these systems were to be upgraded or migrated. There are also areas of work which do not have any system number associated with them in TMS, and are tracked using bespoke "research" numbers e.g. for when external research samples are analysed at the Gallery but their related paintings do not come to the Gallery and are thus not entered into the collection management system. The Gallery also has a large database of digitised images which are managed using files and folder names containing semantic information, such as related inventory numbers and imaging technique, and a bespoke image metadata database that uses this semantic information to automatically connect the images to their related painting. Gallery staff also use further systems to track internal locations, to manage the status of rooms in the building and their contents as well as other additional sources of less structured or bespoke systems using their own IDs.

The Gallery currently supports externally produced identifiers in TMS. When authority files are being created for an artist, for example, two identifiers are included in the record, either from the Getty's Union List of Artists Names[4] (ULAN) and a Wikidata identifier[5] or, if either or those do not exist, a Virtual International Authority File[6] (VIAF) identifier. When bibliographic records are being added, a Digital Object Identifier[7] (DOI) is added if available. The objective is to populate the system with external identifiers incrementally in order to make the information held by the Gallery as interoperable as possible. This is also recommended for compliance with the International Committee for Documentation's (CIDOC) Conceptual Reference Model (CRM),[8] an institution should create identifiers for its own collections and use those from other collections when those are items are referenced.[9]

PID Experiments

The National Gallery has been experimenting with various aspects of PIDs for many years from different angles. Having resources within its scientific department for these experimental projects and the comparatively small size and homogenous nature of its core collection enables the Gallery to develop solutions quickly. Through these experimental projects, the Gallery developed detailed requirements, including the need for a simple identifier registry for all available data and an open API with resolvable URIs. The resolvable URIs can then be used to map data against standard ontology systems, such as CIDOC-CRM to organise data and the International Image Interoperability Framework[10] (IIIF) to present images.

In 2007, the Raphael project,[11] which initially developed a database of comprehensive documentation about the ten paintings by Raphael in the Gallery, moved to semantic

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[1] Gallery System's The Museum System https://www.gallerysystems.com/solutions/collections-management/

[2] https://www.axiell.com/uk/solutions/product/calm/

[3] https://www.sirsidynix.com/eos-web/

[4] https://www.getty.edu/research/tools/vocabularies/ulan/

[5] https://www.wikidata.org/wiki/Wikidata:Main_Page

[6] http://viaf.org/

[7] https://www.doi.org/faq.html

[8] ISO 21127: 2014 http://www.cidoc-crm.org/

[9] http://network.icom.museum/fileadmin/user_upload/minisites/cidoc/PDF/StatementOnLinkedDataIdentifiersForMuseumObjects.pdf

[10] https://iiif.io/

[11] Raphael Research Resource - https://cima.ng-london.org.uk/documentation/

description using the Resource Description Framework[12] (RDF). This project recognised the need to have identifiers as connectors between records as the resource is based on RDF triples and linked data approaches. It is built on a MySQL[13] database and is designed for human rather than machine use via a graphical user interface on a webpage. Later the resource was extended with a SPARQL endpoint[14] to allow computers and softwares to access the information directly.

As part of the IPERION-CH project,[15] which included a task devoted to digital documentation, the National Gallery developed a beta PID System based on Linked (Open) Data dereferenceable URIs. This was the first project to focus on independent identifiers specifically. There had been previous efforts in the past to draw information from various parts of the Gallery together, e.g. conservation science, and through those conversations, the idea of relying on one single source of authoritative data, the collection management system, with other systems connecting into that.

The URI was formed of the dedicated namespace 'https://data.ng-london.org.uk/resource', a three character prefix indicating the type of resource it was followed by two groups of four alphanumeric characters forming the rest of the PID, e.g. 'https://data.ng-london.org.uk/resource/ABC-XXXX-XXXX'. A simple system based on MySQL generated the IDs, which incremented automatically via a set of PHP[16] functions. IDs were assigned to entities including objects, artists, rooms, keywords, events and images. The identifiers could be used to access images via a IIIF server using the 'https://media.ng-london.org.uk/iiif' namespace. This system is dynamic and can display the contents of rooms or all works by an artist.

Figure 2: An illustration of how the same data from the Gallery's API can be presented in different formats including a formatted website, JSON, and RDF XML.

[12] https://www.w3.org/RDF/

[13] https://www.mysql.com/

[14] https://www.w3.org/TR/sparql11-query/

[15] Integrated Platform for the European Research Infrastructure ON Cultural Heritage - http://www.iperionch.eu/

[16] https://www.php.net/

These IDs can then be fed back into the Gallery's systems such as the Gallery's collection management system. This PID system allowed for multiple presentations of the same data based on different standards via an API, e.g. presenting content from a web page in JSON format or XML, see Figure 2. This API was used to inform an app developed as part of the Crosscult project[17] which allowed users to find paintings around the Gallery based on real time data and suggested the best routes around the building depending on the paintings the user wished to see. The same project also used the API to develop a Gallery Creation Game where users could play with how paintings were displayed and arranged around a given room in the Gallery. This required an extension to the existing location data beyond the room the painting is in to its position within the room.

The beta PID system was specified and developed primarily by one member of staff at the Gallery over a year period in conjunction with other commitments.

Production Persistent Identifier Service

The beta system described above has been adapted and refined and is implemented as part of a production middleware solution to allow entities from across the Gallery's main collection, associated authority files and bibliographic references, its library and archive collections to be surfaced through numerous access points, see Figure 1. This work forms part of an ongoing programme to standardise and improve the Gallery's collection information and increase the amount of information about its collection available online. By developing a production PID service as part of the implementation of a production middleware system, it is anticipated that the amount of additional data, such as Wikidata identifiers and Getty ULAN that can be harvested automatically into the system will increase. It will also be possible for other services such as Art UK,[18] Europeana[19] and Google Arts and Culture[20] to update their information automatically from an endpoint connected to this middleware rather than via manually generated spreadsheets. The PID is a core part of the solution as it is the link to connect entities between systems and will be used when outputting the information in a range of formats.

The middleware solution is an open source software called Collection Information Integration Middleware (CIIM) developed by Knowledge Integration.[21] The National Gallery procured this solution and its implementation is ongoing. It allows the information from the collection management system to be fed through to the Gallery's website, intranet and elsewhere. Throughout this project, to improve and overhaul the Gallery's digital collection information, it was recognised that information would never be held within a single system. The aim of the solution is to reduce the complexity of systems. Rather than creating direct links between multiple systems that are each subject to change, with this solution, any system can be changed or swapped out and only the source system's interface with the middleware needs to be updated each time. Consuming systems can remain unaware of changes made in source systems as long as each maintains its links with the middleware.

Currently links between collection items, authority files and bibliographic references, and elsewhere can be made across systems through manual additions, as described above. That method is labour intensive, prone to errors and unsustainable. Automating it will reduce staff time and errors in the data. At this point in the implementation of CIIM, a few key

[17] Empowering reuse of digital cultural heritage in context-aware crosscuts of European history - https://www.crosscult.eu/

[18] https://artuk.org/about/data-harvesting-pilot

[19] https://www.europeana.eu/en

[20] https://artsandculture.google.com/

[21] https://www.k-int.com/products/ciim/

fields from it are used to populate the website but the longer term goal is for the collection information on the website to be fed exclusively from the CIIM's elasticsearch[22] endpoint, transformed and presented via templates in the content management system rather than via data downloaded and stored in the Gallery's content management system.

The solution will also ensure that all of the access points to information about National Gallery resources, e.g. internet pages, the intranet, will have consistent automatically updated information across them. By making the collection information available via the CIIM, it will be possible to present information on the Gallery's website in a more flexible way. Information about the paintings can be curated in different ways and media presented in different formats but robust persistent links to the core collection information can be maintained easily.

This solution will also allow for the creation of several new access points to the data including LIDO XML[23] via OAI-PMH,[24] and a linked data endpoint with either separate RDF files or a SPARQL endpoint. These different formats will be delivered using content negotiation[25] but the URL will be constructed using the entity's PID. The range of endpoints will also increase the potential reuse opportunities and capabilities for reuse by different services, such as Europeana and Art UK, which harvest using different formats. The middleware approach also allows the Gallery to adopt CIDOC-CRM more completely, namely through standardising the organisation of its content.

In addition to addressing external users' needs, the middleware will assist Gallery staff by providing a single authoritative source of information related to the paintings in the Gallery's collection. The potential to include increased scientific and conservation data within this system will broaden the visibility and capacity for research around the collection.

The PID infrastructure, known as a PID Generator, used for this solution is based on the specification implemented in the beta service, with some small adjustments. The URIs have been reformatted to remove any semantic information from them, i.e. the three character prefix indicating the type of resource has been removed and they now consist of three blocks of four alphanumeric characters and the namespace has been adapted removing the "/resource", e.g. 'https://data.ng-london.org.uk/XXXX-XXXX-XXXX'. The PID Generator is integrated completely with the middleware but it sits on a separate database providing a more robust backup system: whilst the data held in the middleware could be recreated from source systems if required, the PIDs cannot.

The middleware system was procured and developed externally but the resource required within the Gallery for the initial implementation was relatively small. There was a small project team including the Collection Information Manager and members of the Information Services, Scientific, Photography and Imaging, and Digital Services departments. It was procured in 2017-8 and Knowledge Integration were able to deliver a large proportion of the work themselves. For example, they were able to do the mapping across the systems and configure the system. While CIIM is available as open source software, implementation of the PID component was new and Knowledge Integration implemented the revised specification developed at the Gallery.

[22] https://www.elastic.co/elasticsearch/

[23] http://cidoc.mini.icom.museum/working-groups/lido/what-is-lido/

[24] https://www.openarchives.org/pmh/

[25] https://developer.mozilla.org/en-US/docs/Web/HTTP/Content_negotiation

This solution will improve the accessibility and interoperability of the Gallery's data, but the way in which it is being implemented still presents some data quality challenges. As the Gallery's main collection management system, TMS, does not natively support creation and management of PIDs for collection items, there could be issues with data deletions and the merging of records as this process will have to be handled manually. While the CIIM will retain stub records for any PIDs which no longer resolve to a record, there is a risk that links to merged records are lost. TMS has a table of alternative numbers that allow for multiple identifiers across records but they are not connected to all types of authority files. Many long standing legacy systems have similar issues and need to be considered as part of an implementation and workflow design for a new system such as this middleware.

While the system is not fully implemented, it is part of the Gallery's business as usual service commitment and therefore needs to be maintained both from a financial and staff resource perspective over a long period. To fully realise its potential benefits, CIIM, and the systems that feed it, will need to be used and maintained by a broad array of Gallery staff.

Future Plans

The initial production PID service will provide a vital step forward in integrating and cohesively implementing identifiers across the organisation. There are also forthcoming plans to convert the information from the Gallery's published catalogues and publish them as html web pages. These will be enhanced and edited over time so the Gallery will need the capacity to version records with PIDs and manage the relationship between versions easily.

Other gaps in the coverage of identifiers will remain following this initial implementation, for example, there are other entities that could have identifiers assigned, e.g. records in the research database of samples, and these will be added in due course. In addition, there is not yet an agreed process for defining all of the additional PIDs required to facilitate connecting all of the Gallery data as rich semantic Linked Open Data, but this work is being planned as part of existing research projects. This would greatly increase the number of identifiers required and could also allow for persistent tracking of changes in the database over time. However, assigning identifiers directly to relationships is less mature than assignment for entities, so procedures for managing issues such as robust version control still need to be agreed.

Through using PIDs, the enhanced location data structure defined during the Crosscult project, described above, could also be integrated into other systems for internal purposes including tracking visitor flow, documenting exhibitions and location of sensors amongst others. It is only through using standardized metadata can these extensions be achieved easily and in a timely manner.

The identifiers that are used in this system are resolvable but they are not included in a global registry as some other identifiers such as DOIs or ARKs would be. The result is that the Gallery itself is solely responsible for maintaining the resolver and its identifiers with no external support or governance. Inclusion in a global registry will be considered in part of the future planning of the resource.

Conclusion

The National Gallery is still in the process of implementing its PID service; however, it is clear on the potential benefits that can be realised through this implementation. By utilising PIDs through a middleware solution, the Gallery easily realises one of the major benefits of using identifiers: to connect and link data across systems and provide both internal and external users real time, accurate and detailed data when it is needed in the format desired. While this initial implementation does not cover every entity held within the Gallery, it provides a starting point into which other systems can be connected.

Other organisations could adopt a system either similar to the beta system developed by the Gallery in house or procure a solution externally. However the success of this production solution and its potential is increased by the investment from the Gallery in improving its collection data and commitment to making it available externally. The relatively small size of the Gallery's collection has made that detailed work possible which may not be true of other collections.

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Glossary

- API - Application Programming Interface. A software which allows the interface between two programmes.
- CIDOC-CRM International Committee for Documentation's Conceptual Reference Model. ISO 21127:2014. This international standard is used for information integration in the field of cultural heritage. It provides a framework for describing the concepts and relationships in heritage documentation.
- CIIM - Collection Information Integration Middleware. A middleware solution provided by Knowledge Integration and adopted by the National Gallery.
- DOI - Digital Object Identifier. A widely adopted persistent identifier.
- Getty ULAN - Getty's Union List of Artists Names
- IIIF - International Image Interoperability Framework. A standard for displaying images online.
- Linked Open Data - A model for globally available data based on RDF standards and the semantic web.
- Middleware - a software which acts as a bridge between an operating system or database and applications
- Namespace - In this context of discovering resources online, the Domain Name System organises websites into hierarchical namespaces
- PID - Persistent Identifier
- TMS - The Museum System. Collection management software developed by Gallery Systems.
- Dereferenceable URI - A dereferenceable Uniform Resource Identifier is a resource retrieval mechanism which allows you to retrieve a representation of the resource using internet protocols
- VIAF - Virtual International Authority File. It combines multiple name authority files into a single authority service. Hosted by OCLC.

Appendices

Appendix 1 - National Gallery Staff Consulted

- Alan Crookham, Research Centre Manager
- Joseph Padfield, Principal Scientist
- Rupert Shepherd, Collection Information Manager
- Lawrence Chiles, Head of Digital Services

Appendix 2 - About Persistent Identifiers as IRO Infrastructure

Museums, heritage collections and sites in the UK house at least 200 million physical and digital objects. Being able to identify these objects supports their discovery, use and curation - you cannot provide persistent or even consistent access to an item if you don't know what it is. Accession numbers are a key component in all collection and library management systems but these only cover selected objects within an individual collection. To fully realise the potential of our national collections, we need identifiers that can bring together collections across institutional boundaries.

Persistent Identifiers (PIDs) provide a long-lasting click-able link to a digital object. They are recognised by UKRI as a tool for enabling data discovery, access and citation. Supporting wider use of PIDs for collection objects, environments, specimens and related items will allow long-term, unambiguous linking of collections that will create a digital National Collection. However, the challenges, utility and wider benefits of PIDs are not as well understood across the heritage sector as they could be.

This project will bring together best practices in the use of PIDs, building on existing work and projects. We will share expertise and provide recommendations on the approach to PIDs for colleagues in institutions across the UK heritage sector. Through a mixture of workshops, desk research and case studies, the project will answer questions such as 'What are the gaps in the existing PID landscape for heritage collections, buildings and environments?' and 'What should a PID infrastructure, strategy and governance framework look like for a unified national collection?'.

This project is a Foundation project within the AHRC funded Towards a National Collection Programme.[26]

Appendix 3 - About Towards a National Collection

Towards a National Collection is a major five-year £18.9 million investment in the UK's world-renowned museums, archives, libraries and galleries. Funding is provided through UK Research and Innovation's Strategic Priorities Fund and delivered by the Arts and Humanities Research Council (AHRC). The programme will take the first steps towards creating a unified virtual 'national collection' by dissolving barriers between different collections – opening UK heritage to the world. By seizing the opportunity presented by new digital technology, it will allow researchers to formulate radically new research questions, increase visitor numbers, dramatically expand and diversify virtual access to our heritage, and bring clear economic, social and health benefits to communities across the UK. The innovation driven by the programme will maintain the UK's world leadership in digital humanities and set global standards in the field.

[26] https://tanc-ahrc.github.io/HeritagePIDs/

The Programme's main objectives are:

- to begin to dissolve barriers between different collections
- to open up collections to new cross-disciplinary and cross-collection lines of research
- to extend researcher and public access beyond the physical boundaries of their location
- to benefit a diverse range of audiences
- to be active and of benefit across the UK
- to provide clear evidence and exemplars that support enhanced funding going forward

Aims of the Programme
The aim of the programme is to begin to dissolve barriers between different collections, opening them up to new cross-disciplinary and cross-collection lines of research, and to extend researcher and public access beyond the physical boundaries of their location, thus directly addressing the issues related to accessibility beyond current metropolitan centres. The programme will extend across the UK including all the devolved nations, and will potentially have a global reach in terms of setting a standard for other countries building their own collections (with the long-term potential for inter-connection between the national collections).

This programme will have a transformative impact on:

- Digital search and cataloguing tools, technologies and methodologies, and associated issues
- Research capability, by enabling search across collections to address cross-cutting research questions which will allow UK to maintain UK leadership in cross-disciplinary research
- The heritage sector as a whole, in terms of enhancing access for researchers, and for facilitating wider and better-informed public engagement

There are two rounds of funding calls – the Foundation Projects and the Discovery Projects.[27]

[27] https://www.nationalcollection.org.uk/about