Authority Control Today: Principles, Practices, and Trends

Authority control enhances the accessibility of library resources by controlling the choice and form of access points, improving users’ ability to efficiently find the works relevant to their information search. While authority control and the technologies that support its implementation continue to evolve, the underlying principles and purposes remain the same. Written primarily for a new generation of technical services librarians, this paper illuminates the importance of authority control in cataloging and library database management, discusses its history, describes current practices, and introduces readers to trends and issues in the field, including future applications beyond the library catalog.

**Introduction**

Barbara Tillett explained the essential nature of authority control within libraries over three decades ago, stating, “In order to accomplish the finding and gathering functions, the catalog must have authority control. Authority control is inherent to a catalog and without it, a file cannot be considered a catalog.”[[1]](#endnote-1) Technical services librarians today must be just as passionate about this essential function of their jobs. In a foundational text on the topic, Clack states, “What is authority control? It is a technical process executed on a library catalog to provide structure. Uniqueness, standardization, and linkages are the foundation of authority control.”[[2]](#endnote-2)

In the process of identifying and describing information resources, catalogers create descriptive (or bibliographic) records that are gathered into a library catalog, which serves as a tool for library users to find resources that meet their information needs. The information resource is described within a structured bibliographic record with various types of information keyed into data fields. Within this context, authority control is a key aspect of the cataloger’s work. The cataloger must select the names, subjects, and titles that are associated with the information resource and enter these in searchable fields within the record. These become the access points by which the resource may be found through the searching functions of the catalog. Authority work is the process by which the cataloger ensures that the catalog links related resources through the foundational concepts outlined by Clack: uniqueness, standardization, and linkages. By ensuring an access point’s uniqueness, catalogers allow for differentiation between similar names or terms. Standardization helps catalogers to select an authorized access point which will allow related resources to be collocated. Catalogers adhere to guidelines for creating authority records for names and titles utilizing standards such as *Resource Description and Access* (RDA). The use of common thesauri such as Library of Congress Subject Headings (LCSH) for selecting subject terms also makes use of standardization to support the access points. Linkages are made possible through the encoding standards that underpin the data elements.

In the days of the card catalog, authority maintenance was a very time-consuming and manual process, with each change requiring the original term to be crossed out and replaced by the updated term handwritten on every affected card from the catalog or the typing or printing of entirely new cards to incorporate the changed terms into the card catalog. Although authority control is no longer such a manual process due to technology developments and the evolution of cooperative practices across libraries, considerable effort is still required. Catalogers must perform the work to identify preferred terms for new names and subjects to add to the catalog in such a way that similar terms are differentiated and variant forms are linked together, thus ensuring the library’s patrons will receive more accurate and complete results in their information search. With the upcoming generation of technical services librarians in mind, this paper seeks to provide a foundational introduction on the topic including a history of the development of authority control practice, definitions of key terms, discussion of the content and encoding metadata standards that govern how authority records are created, and a description of current authority control practice within libraries. The use of local and cooperative authority files are discussed, along with an introduction to the automation of authority control through library vendor services. This paper also elucidates the importance of authority control in cataloging and library database management and how authority control benefits users of the library catalog in helping them find the information resources they need. An introduction to current issues and trends within the field includes discussion of authorized headings as facets, federated authority databases, linked data, and ethical authority control practice. Finally, the future of authority control is explored.

**History of authority control**

The history of authority control is intertwined with the history of library cataloging, including the development of theory, principles, and practices for creating, maintaining, and sharing a library catalog. The library catalog is the register of all bibliographic items (i.e. information objects) available in a library. This register records various kinds of information about each information object in the library’s collection and has taken on varying forms and styles over the years as cataloging principles and practices were developed.

In the mid-19th century, Anthony Panizzi, a key figure in the development of the library catalog, established a 91-rule plan to "systematize the operation of cataloging."[[3]](#endnote-3) These rules created a prototype of modern day catalogs with entry headings, descriptions, references, and notes recorded for each item in the catalog. Panizzi’s 91 rules demonstrated the value of creating uniform headings for recording information about library materials in the library catalog. This creates bibliographic entries with consistent access points used to find and collocate library materials.

Charles A. Cutter's 1904 “Objects and Means” for the catalog[[4]](#endnote-4) codified the catalog’s purpose of connecting patrons to library materials and defined the kind of information required to achieve this end. The Statement of Principles adopted by the International Conference on Cataloguing Principles (ICCP) organized in Paris, France (also known as the "Paris Principles" 1961)[[5]](#endnote-5) and Seymour Lubetzky[[6]](#endnote-6) showed the value of simplifying and standardizing cataloging rules to create a universal standard allowing interoperability between library catalogs. Authority control as practiced presently is rooted in these and other key figures and developments that have pursued efficiency through consistency in the construction and use of the library catalog.

Up until the late 20th century library catalogs were analog in form. These forms ranged from handwritten tablets, indexes, and manuscripts to published books and files of index cards. Each form of the catalog listed library materials alphabetically by the author’s name, title, subject, or call number. These same analog forms for recording library materials stored the approved terms for names, titles, and subjects that were used as headings in the creation of catalog entries. For example, each card in a card catalog contained at the top the primary way the item could be found (i.e. the main entry heading) followed by other descriptive detail and physical location details to help patrons find the item they needed. A typical catalog card is shown in Figure 1. In these formats, items in the library catalog authored by the same person would be collocated together in the list or index card file because the form of the person’s name was consistently recorded and filed. Entries (either in a list or on a card) also contained references to other related headings and items, helping guide the patron to their desired item.

The development of computer technology enabled printing the analog catalog, making the production and maintenance of the catalog more efficient. These technological advances also led to the development of MAchine Readable Cataloging (MARC)[[7]](#endnote-7) as an encoding standard for both bibliographic and authority metadata[[8]](#endnote-8). Developed by Henriette D. Avram in the 1960s while working for the Library of Congress, MARC “attempted to both convert and manipulate the data stored on a catalog card.”[[9]](#endnote-9) In 1974 the Library of Congress began issuing lists of newly created and updated name headings for use in other libraries. The first MARC-based authority records were created by the Library of Congress in 1977, and the first edition of *Authorities: A MARC Format* was published a few years later in 1981, making available a national standard for recording, storing, and sharing electronic authority records. In a relatively short amount of time, MARC developed into an international standard that increased sharing and interoperability between libraries and their catalogs.[[10]](#endnote-10)

As computer technology improved and computer networking technology developed, the library catalog was converted to an electronic environment, removing the need to publish an analog catalog list or card file. Files of authorized headings were also converted into this new digital environment. In a computer environment that involves various networks, creating, updating, and sharing catalog metadata became much more consistent and efficient. Libraries adopted integrated library systems developed by 3rd-party software companies that connected the library’s many functions (e.g. acquisitions, circulation, and discovery) to the metadata in the catalog. These systems provide patrons a digital (or online) interface for searching and browsing the catalog. Authority metadata is utilized in these search interfaces to guide patrons to the preferred form of terms and headings that are used in catalog records so that patrons know how and what to search to meet their information needs. While enabling access to vast quantities of information, the creation and growth of the WWW and online search engines are recent developments in the history of the library catalog, posing unique challenges and opportunities that continue to shape authority control today.

**Authority control defined**

Authority control must be understood within the context of the library catalog and its essential functions. The library and its staff meet the information needs of library patrons by acquiring, processing, cataloging, maintaining, and circulating physical and digital information resources (e.g., monographs, e-books, journals, reference materials, scholarly articles, archival collections, audiovisual items, databases, maps, etc.). Cataloging is the process whereby catalog librarians create, update, and maintain metadata through careful description and structured information display to assist users in discovering library resources that best serve their needs. Commonly referred to as “data about data,” metadata is the sum total of what one can say about a given information object at any level of aggregation recorded in a structured form.[[11]](#endnote-11) Metadata for an information resource is organized in a bibliographic record. Bibliographic records are collected together into a database that is part of the library catalog. Bibliographic records contain the metadata to describe, differentiate, relate, and locate information resources. In this way, the bibliographic record acts as a surrogate for the information resource, allowing the library patron to learn about a particular item and decide whether it will meet their need without having to examine each potential resource.

Authority control is the set of processes and procedures to formulate and record “*authorized* heading forms in [bibliographic] records” so that “access points to [bibliographic] records are given one and only one conventional form.”[[12]](#endnote-12) When catalogers perform authority work they establish, through verification and validation, controlled headings or authorized access points for various entity types (e.g., people, places, corporate bodies, families, titles, subjects, and genres) used in information resource description. These authorized access points create a consistent, predictable form to uniquely identify information resources (e.g. by choosing the item’s author, series title, subject, additional contributors, etc.) and collocate related resources (e.g. bring together all items by a given author or about a specific subject). Additional metadata is also recorded to differentiate similar entities and document decisions made by the cataloger. All metadata associated with an authorized access point is organized into an authority record. To maintain consistent and unique access points within a library catalog the recording of metadata in an authority record is governed by metadata content standards.

**Metadata Content Standards for Authority Records**

Metadata content standards govern what to record in a metadata element or record. Resource Description and Access (RDA) is an international metadata content standard providing guidelines and instructions to create and maintain well-formed bibliographic and authority metadata. The development of RDA is controlled by the RDA Steering Committee (RSC). The guidelines in RDA are based on the International Federation of Library Associations and Institutions (IFLA) Library Reference Model (LRM) which provides an entity-relationship framework for describing information resources. The RDA Toolkit[[13]](#endnote-13) is a web-based resource catalogers can use to view and reference RDA documentation and guidelines. The Descriptive Cataloging Manual (DCM) Z1 and the LC Guidelines Supplement to the MARC 21 Format for Authority Data are manuals made available by the Library of Congress to guide catalogers in creating and maintaining name and series authority records. The LC Subject Headings Manual is a resource maintained by the Library of Congress detailing standards for creating and using subject authority records. These content standards and manuals guide catalogers to create authority records for the following entities: personal names, families, corporate bodies, places, works, expressions, series, and subjects (see Figure ?). Newer LRM entities such as timespan and nomen may in the future come under authority control, although they are not currently. An authority record constructed following these standards consists of five major components: the authorized access point, variant access points, related access points, associated attributes describing the entity, and source information.

*Authorized Access Point*

The authorized access point is the preferred form for referring to an entity. RDA guides the cataloger in determining the preferred name or title for the entity based on the information resource being described. For example, if cataloging a monograph about the American actor James Stewart the authorized access point could be established as “Stewart, James, 1908-1997” rather than “James Stewart”, “Stewart. James”, “Stewart, James Maitland” or any other possible form or variation used. Using one and only one form of his name ensures all resources authored by, contributed by, or about this American actor can be collocated together. This authorized access point also differentiates this James Stewart from other people using the same or similar name by including his birth and death dates. Authorized access points for works, (i.e. distinct intellectual or artistic creations), are established by choosing the preferred title of the work. For an entity representing the work “Moby Dick” written by Herman Melville an authorized access point could be “Melville, Herman, 1819-1891. Moby Dick.” Any edition, translation, or manifestation of this work could be found together if organized under this authorized access point. Authorized access points recorded in the authority record can be used within bibliographic records in the description and subject analysis of an information resource acquired by a library. Using these controlled terms creates predictable and consistent metadata used to better collocate related resources and differentiate similar entities.

*Variant Access Points*

If an entity can be identified by more than one form variant access points can be recorded. These access points help guide library users to the authorized access point in search and retrieval. RDA provides instruction for when and how to record variant access points for the various authority entity types. For example, resources authored by or about English playwright, poet, and actor William Shakespeare can manifest spelling variation in his last name (i.e. Shakespear vs. Shakespeare) as well as variation in non-English language resources. Variant access points can also be recorded for works. For example, J. R. R. Tolkien wrote a work called “The Hobbit, or There and Back Again.” If the authorized access point for this work was established as “Tolkien, J. R. R. (John Ronald Reuel), 1892-1973. Hobbit”, a variant access point could be created for the fuller title: Tolkien, J. R. R. (John Ronald Reuel), 1892-1973. Hobbit, or, There and back again.” Capturing these variations in variant access points leads patrons to the authorized access point whether or not they know the form recorded in the authorized access point.

*Related Access Points*

Each entity represented by their authorized access point can have relationships with other entities and their authorized access points. Guidelines in RDA help catalogers determine when and how to record these relationships. For example, consider the authorized access point of “Yes (Musical group)” for the English progressive rock band Yes. The authority record for this band could include a related access point for the original lead singer of the group “Anderson, Jon, 1944-”. Conversely, the authority record for “Anderson, Jon, 1944-” could contain a related access point relating him to the band “Yes (Musical group)”.

*Associated Attributes*

In addition to the authorized access point, variant access point, and related access points, entities can have additional attributes that help differentiate similar entities. RDA and other standards specify what attributes can be recorded when known and when to use those attributes in helping distinguish an entity from another in an access point. Related attributes can include associated dates, fuller form of name, associated place, occupation, associated group, type of corporate body, creator and audience characteristics, or form of work. For example, a name authority record for “Savage, C. R. (Charles Roscoe), 1832-1909” includes his birth date (1832), death date (1909), and fuller form of his name (Charles Roscoe). It also includes attributes showing he was associated with Utah and worked as a photographer.

*Source Information*

In addition to establishing the authorized access point for a given entity the authority record acts as documentation showing what decisions were made when the authority metadata was created and why. RDA and the DCM Z1 instruct catalogers to record reference sources used in establishing access points and recording related attributes. These sources include the name of the source, when it was published or accessed, and the evidence found that supports the decisions made in the authority record. For example, when creating a series authority record for David Eddings’ Belgariad series while cataloging the third book in the series the following reference note could be created providing evidence for the choices made in the record: “Magician’s gambit, 1983: title page (Book Three of The Belgariad) title page verso (The Belgariad / Book Three)”.

**Metadata Encoding Standards for Authority Records**

Authority records can be formatted for electronic storage, transmission, and retrieval using various metadata encoding standards. Libraries primarily encode authority records using the MARC 21 format for authority data. Figure 2 shows a MARC name authority record for a person entity. It illustrates how authority metadata is encoded following the MARC format by using numeric tags that are machine-readable (see Figure 5). The authorized access point is recorded in the 100 tag and represents the established form for this person entity that is recorded in a bibliographic record anytime an information resource by, about or otherwise associated with this person is added to the library catalog. Variant access points are recorded in the 4XX tags (the “X” referring to any numeral; e.g. 410, 411, or 430) and provide “see from” references to guide patrons and staff to the established form in the 1XX tag. Relationships from one entity to another are recorded in the 5XX tags and generate “see also” references such as a related corporate body or a recognized pseudonym under which an author also writes.

Within the MARC authority record, 3XX tags contain attributes associated with the person including related locations (e.g. birth and death place), areas of professional activity or expertise, occupation, associated organizations, gender, language, and fuller form of the name. The 6XX tags provide additional notes that guide catalogers in using the data in this record. In particular, the 670 tag identifies sources that show evidence for the decisions and metadata included in the record. Most importantly, these sources provide evidence for the forms chosen in the 1XX and 4XX fields. Tags 000, 001, 005, and 008 represent fixed field data to identify information about the record itself, including the type of record, when the record was created, and how the record can be used. Tags 010 and 035 are control numbers that uniquely identify the authority record in library systems and databases and facilitate record overlay when updating authority records. Tag 040 identifies the language of description and the content standard for the metadata. It also identifies the institutions that contributed to the creation and maintenance of the record. Dates related to the entity, including birth and death dates, are coded in the 046 tag. Any 9XX tags store local information specific to the source database for the record. In addition to personal names, MARC authority records are created for place names, corporate bodies, families, series, works, expressions, topical and geographic subjects, and genres. The MARC 21 format for authority data provides a sophisticated encoding standard for recording, maintaining, and sharing authority metadata.

**How Authority Control is Used in Libraries**

In the process of cataloging an information resource the cataloger chooses access points to uniquely identify the resource and to collocate related resources. Access points represent a unique entity and are recorded in authority records. Authority records are stored and maintained within an authority database or authority file. If an authority record for a chosen entity exists in an authority database, the cataloger can re-use the authorized access point from the authority record. If an authority record for the entity does not yet exist in the authority database, the cataloger can add a new authority record to the file, whether by creating a new record or downloading an existing authority record from an external source. Authority databases can be categorized into two main kinds: local and cooperative. A local authority database refers to an authority file stored and maintained by an individual information organization. A cooperative authority database refers to an authority file stored and maintained by a community of information organizations at a regional, national, or international scale.

Many libraries maintain a local authority file using a variety of means including batch loading records, partnering with library vendors, participating in cooperative cataloging programs, or manually creating or editing authority records one-by-one. A library’s local authority database is typically maintained as part of their integrated library system (ILS) alongside other library metadata including bibliographic records. To disambiguate seemingly similar but different resources and collocate related resources, the ILS forms relationships between authority and bibliographic records by using the authorized access point from the authority database. When an access point used in a bibliographic record matches the authorized access point from an authority record, a link may be created to the authority and indexed in the system along with links from variant references and from related entries defined in the authority record.

As an example, consider an authority record representing Steve Jobs, the founder of the corporate body Apple, Inc (see Figure 2). Bibliographic records for information resources attributed to Steve Jobs or about Steve Jobs will include the form of his name found in the 1XX field of the authority record as a heading in the bibliographic record (see Figure 4). The authority record for Apple, Inc. includes a link from Steve Jobs as the founder of the corporate body (see Figure 3) to Apple, Inc. The ILS does the work to index and collocate these related records for later search and retrieval. The library catalog or discovery system that a library uses to help patrons search, browse, and discover information resources can utilize the information recorded in the authority record to collocate materials with bibliographic metadata that shares the same authorized headings, direct patrons from variant forms and terms to the authorized form, and disambiguate similar headings in search results (see Figures 6-7).

**Cooperative Authority Databases**

A library’s local authority database stands in contrast to cooperative authority databases maintained on a regional, national, or international scale. Libraries can participate in cooperative cataloging programs allowing them access to a pool of shared authority records as well as allowing them to contribute new or updated records to the shared database. The Library of Congress’s Program for Cooperative Cataloging (PCC) maintains various cooperative cataloging initiatives including the Name Authority Cooperative Program (NACO) and the Subject Authority Cooperative Program (SACO). These two programs create and maintain a national database of authority records that can be leveraged by libraries in the creation and maintenance of their own local catalogs. Libraries can automate the integration of records from the shared cooperative databases into their local authority database whether they participate in the programs or not.

Cataloging students may receive base instructions on authority control in beginning or advanced cataloging courses but learning how to perform authority work is more often accomplished on the job than in library school, especially to the level of competence that is required to effectively maintain good authority control.[[14]](#endnote-14) This can be achieved through a combination of in-house training, attendance at workshops or online trainings, staying up to date on library literature related to authority control, and regular, practical application through mentored authority work during cataloging activities.[[15]](#endnote-15)

**Automated authority control**

Many libraries use vendors to obtain authority records and to purchase authority control services as means of automating the clean up of headings in their bibliographic database and the maintenance of their local authority file. Due to the labor-intensive nature of authority control, outsourcing some of this work can increase efficiency and control costs.[[16]](#endnote-16) The number of options for outsourcing authority control services has decreased in recent years to a handful of vendors,[[17]](#endnote-17) the majority of which provide similar services. When a library is shopping for an authority control vendor, a formal request for proposal (RFP) may be issued, allowing for vendors to respond to the library’s listed requirements and formally bid their services for comparison. However, a simple price quote request may be sufficient for the library’s needs, as long as there is thorough communication between the library and each potential vendor about the specific services that will be included and documentation of these options.

Once a vendor has been selected, the library works with an assigned project manager to develop a project profile which documents the library’s selections on a number of processing options related to file transfer, bibliographic record cleanup and enrichment, bibliographic heading and authority file matching, record output, and reporting.[[18]](#endnote-18) Processing samples can usually be requested before or after contract signing to establish expectations for the results of the desired service.

Automated authority control processing of the library’s full bibliographic database establishes a master or base file. The library’s bibliographic headings are cleaned up and normalized in preparation for matching against the selected authority files, especially the Library of Congress Name Authority File (NAF) and Library of Congress Subject Headings (LCSH). If a heading matches the 1XX or 4XX from an authority record, the authorized form will be inserted into the bibliographic record and the authority record will be included in the output files. While this is primarily an automated matching process, sometimes human oversight is required to detect and correct false matches. The library then receives a cleaned up file of their bibliographic records and all the associated authority records to load into their Integrated Library System (ILS. Customizable reports are also included, allowing libraries to follow up the automated processing with any needed manual review for headings that could not be confidently matched by the machine. This maximizes the benefits of an automated authority control workflow while allowing library staff to focus their efforts on the authority work that most needs their expert evaluation.

Optional ongoing services can also be contracted for continued automated maintenance of the library’s authority file. Bibliographic records that have been added to the library’s database since the original base file processing are sent to the vendor to undergo the same process. Vendors may also provide periodic reports and MARC extracts of the authority records which have changed since the library’s last processing.

For many libraries, outsourced automation of authority control is a routine aspect of technical services work. With the changing landscape of metadata tools, shrinking cataloging departments, and evolving library collections, some libraries are developing methods for automating authority control in-house, using MarcEdit, SQL queries, and batch processing.[[19]](#endnote-19) For programming-savvy librarians, these methods can be worthwhile to explore. Another potential new trend is the provision of authority control within the ILS itself, as debuted by Ex Libris’ Alma.[[20]](#endnote-20) If other library systems begin offering built-in authority control functionality, vended authority control may become a less common workflow.

**Importance of authority control**

The importance of authority control lies in its ability to support users’ information retrieval needs through the authorized terms in the authority file acting as a controlled vocabulary with consistent, reliable, and unique terms. This brings precision to searches and collocates related materials in results lists. The structure of authority records with cross references and hierarchically related terms collocates works on the same topic and improves navigation between related concepts. Through the use of access points, it also allows for linking between library resources and other tools, especially online.[[21]](#endnote-21) End users benefit from the predictability of consistent naming and more precise results.

Library staff also benefit from the consistent application of authority control practices within the catalog. Whenever an item needs to be added to the catalog that has the same author as another work already cataloged, the time spent describing the new item by the cataloger is decreased if the name has already been established in the library’s authority file. Maintaining a current copy of authority records in the local file is important. Outsourcing the portion of authority control work that can be automated can improve catalogers’ time and resource management,[[22]](#endnote-22) allowing catalogers to spend their limited time on the portion of authority work that requires their especial expertise. Establishing entities in a prescribed and structured way ensures that both catalogers and patrons know how to differentiate between similar entities when cataloging or searching the library catalog for information resources.

**Beyond the library catalog**

***Authority control for archives***

Libraries may need to consider how archival authority structures complement bibliographic authority records and how these can work together in their discovery system. Many libraries, especially within academic institutions, coexist with archives, which often means that bibliographic records for traditional library materials must also commingle with descriptions of archival materials, whether within the library catalog, through a discovery layer, or in other applications. Finding aids are a common discovery tool used to describe archival and manuscript collections. This description can be hierarchical in nature, often divided into related records within series and sub-series, and sometimes described down to the item level, allowing for relationships between materials within the collection to be preserved and contextual information to be demonstrated. While collection-level MARC records for archival materials may reside in the library catalog to allow for both books and related archival materials to be found within the same information search, the finding aid remains “the preferred method for describing archival materials.”[[23]](#endnote-23) Finding aids generally reside outside of the library catalog in another description platform such as an archival management system like ArchivesSpace or in a web-based discovery tool.

Authority work for archival materials must often be undertaken in multiple realms. The collection description in the library catalog will usually conform to traditional library authority control procedures and utilize authorized terms from library authority thesauri. The corresponding archival description within the library’s finding aids database also benefits from authority control. Archival authority records describe persons, families, and corporate entities associated with a body of archival materials and may be created utilizing the content standard in Part II of *Describing Archives: A Content Standard* (DACS)*[[24]](#endnote-24)*, supported through the structural standard Encoded Archival Context-Corporate Bodies, Persons, and Families (EAC-CPF).

The relationship between archival authorities and library authorities has evolved in recent decades, as the concept of “context control” comes to fruition, especially through the archival authority record’s inclusion of “administrative histories and biographical sketches of organizations or individuals who create records” and its documentation of “the relationships between records creators and the records themselves.”[[25]](#endnote-25) One noteworthy development in the realm of archival authorities is the international cooperative program Social Network and Archival Context (SNAC), which matches archival authority records from various institutions against the Library of Congress Name Authority File and other sources of authorities to merge records for the same entities. This allows for archival authority descriptions to be linked with related archive, library, and museum resources, demonstrating the power of coordination between library and archival authority control practices.[[26]](#endnote-26)

***Digital collections and institutional repositories***

Information retrieval in other areas outside the bibliographic realm also greatly relies on the consistent presentation of names and subjects in their databases. Digital collection metadata is an example of another data repository for which authority control should be considered important.[[27]](#endnote-27) Description records for digital objects may be included alongside bibliographic catalog records in discovery layer results lists. The form and choice of access points (i.e., author, subject, title, etc.) should be consistent across platforms in order to enhance discoverability and meet user expectation, especially in regard to bringing together descriptions of physical library materials with a digitized version of the same items. Institutional repositories are another area that may benefit from consideration of authority control within the context of a library’s workflows and procedures, particularly since the lack of consistency in name forms in such systems “inhibits retrieval of items by a single author.”[[28]](#endnote-28)

**Issues and trends**

***Authorized headings as facets***

Advances in computer and networking technologies, including the move towards linked data and Semantic Web, are influencing the evolution of cataloging and authority control. The use of lexical or keyword searching in library catalogs and discovery systems has pushed metadata creators and stewards towards viewing these authorized terms used in bibliographic description as facets[[29]](#endnote-29) that discovery tools can surface to patrons for filtering and improving information retrieval. The controlled vocabulary Faceted Application of Subject Terminology (FAST)[[30]](#endnote-30) developed by OCLC is one example of this trend towards leveraging authorized terms as facets. As a controlled vocabulary for subject analysis derived from the Library of Congress Subject Headings (LCSH),[[31]](#endnote-31) FAST aims to simplify the control, use, and navigation of subject headings. Using FAST headings in bibliographic metadata enables easier indexing and display in discovery systems for use by patrons during the information retrieval process.[[32]](#endnote-32)

***Federated Authority Databases***

Computing and networking technologies enable a network of authority files and databases that are increasingly interconnected and open. The Virtual International Authority File (VIAF)[[33]](#endnote-33) is an authority aggregator that collects established authorities from various authority databases throughout the world. This service provides a portal for librarians and information scientists to identify established authorities for personal, corporate, and geographic names as well as works, expressions, and bibliographic titles. VIAF also enables reconciliation services to disambiguate between those entities.

Another service receiving increased attention within cataloging and metadata communities is Wikidata from the Wikimedia Foundation.[[34]](#endnote-34) Wikidata is a core service of the Web and the Semantic Web[[35]](#endnote-35) that enables establishing and interlinking entities between various authority databases and services to more fully describe and disambiguate people, places, works, subjects, and genres. Similar to VIAF, it provides a hub for bringing together the various authorized forms and identifiers of an entity in a single location for reference and use. For an example, see the Wikidata entry for William Shakespeare (<https://www.wikidata.org/wiki/Q692>). Adding the unique Wikidata identifier to a library authority record provides access to other authority sources that could help library staff and patrons uniquely identify entities for their work and research.[[36]](#endnote-36) The Library of Congress’s Linked Data Service[[37]](#endnote-37) is an example of a national institution providing access to their authority metadata for use by catalogers as well as developers working on library metadata systems and discovery tools.

These and other services aid catalogers in uniquely identifying authors and their creations. Open Researcher and Contributor ID (ORCID)[[38]](#endnote-38) is a service that allows scientific and academic authors and contributors to uniquely identify themselves regardless of how their name is referenced in a publication so that their creative works are correctly attributed and collated together. This service acts as a form of authority control to disambiguate authors and their scholarly contributions. Additionally, ISNI[[39]](#endnote-39) is an international standard identifier and service to establish permanent and unique identifiers for the names of creators across multiple domains. This service allows individuals and organizations to establish an ISNI identifier and provides a searchable database for identifier lookup.

***Linked Data***

Developed from the early 2000s, linked data and the Semantic Web[[40]](#endnote-40) are technologies and best practices for publishing data on the WWW. Central to these technologies and best practices is the use of Uniform Resource Identifiers (URIs)[[41]](#endnote-41) to uniquely identify an entity rather than relying on the string representation (or label) for a given entity[[42]](#endnote-42). Building on the URI protocol are International Resource Identifiers (IRIs)[[43]](#endnote-43) that expand the allowable set of characters used in a resource identifier. The use of URIs and IRIs in authority work is a growing trend to facilitate more implicit linking of entities to other datasets, data repositories, and catalogs that exist online. For example, recent updates to the RDA Toolkit seek to improve integration with linked data environments by increasing the use of IRIs and adding new entities and elements that are aligned with linked data best practices. Some authority control vendors include a URI/IRI enrichment option to their services to facilitate this linking work. These links enable a graph of linked entities that can be related and traversed in ways that reveal new paths of knowledge and understanding that were not present previously. To form an accurate knowledge graph requires differentiated and unique entities and relationships between entities. While authority control is primarily focused on managing access to entities by authorizing a specific form of a name, title, or topic, identity management prioritizes assigning unique identifiers to a single entity over differentiation of names. The move towards linked data and the Semantic Web broadens and expands the role of authority control from determining discrete access points used in bibliographic description to a process of creating and managing entities and their relationships to other entities. The evolution from authority control to entity and identity management blurs the lines between bibliographic description and authority work.

**Ethical authority control practice**

In addition to staying informed about technological changes and the opportunities they present, catalogers must also remain aware of developments within other areas in the field. Catalogers are increasingly cognizant of the significant power they have in the creation of personal name authority records, as they determine how a creator will be described in the authority record. While differentiation is an important aspect of authority work, careful consideration must be employed in determining which of several possible forms of a name should be used as the authorized form by which an individual will be known and in selecting the key descriptors to include in authority records. Two main areas of authority work that are impacted by ethical concerns center around the creation of name authorities and the use and selection of subjects.

Many ethical issues faced by catalogers in creating, maintaining, and using name authority records surround the issues of privacy and safety. Consider, for example, the ethical issues that may come into play when doing name authority work for the creator of a zine, which is a low-distribution, self-published booklet generally used to convey personal experiences, information, or interests. Because zines may contain sensitive or very personal information, some zine creators do not want their identity known, or they may only use a partial name or a pseudonym. While the cataloger may feel the responsibility to do further research about a particular zine creator in order to connect all resources they have authored, being aware of the environments in which zines are created and distributed necessitates caution. The Zine Librarians Code of Ethics includes guidelines for identifying and creating authority records for zine creators which emphasize respecting their privacy and not exposing legal identities of zine creators when not explicitly found in the zines themselves.[[44]](#endnote-44) Name authority work also requires consideration of the safety of the subject of the name authority record when recording characteristics of the individual authors themselves. For example, the option to include gender terms in authority records has raised concerns from the library community about outing transgender and gender diverse individuals. While the Program for Cooperative Cataloging Ad Hoc Task Group on Gender in Name Authority Records published a report in 2016 to suggest best practices for recording gender, the discussion is still ongoing, with the issues of self-determination and consent at the core.[[45]](#endnote-45) These and many other issues require the intentional and thoughtful practice of ethical name authority work.[[46]](#endnote-46)

Ethical concerns also come into play when catalogers are assigning subject terms. [sentence about bias and example of bias]. Another ethical issue that may need to be considered with relation to subject … is the risk of hindering access to library materials through [application of subject headings inappropriately due to lack of sufficient familiarity with the subject matter or through the selection of antiquated terminology. [example of indigenous terminology that the local community wouldn’t search by… and naming] [conclusion sentence for subjects paragraph]

As practitioners grapple with these challenging decisions in their authority work, important conversations are emerging in academic literature, conferences, forums, committees, and working groups. To bolster the development of each individual cataloger’s judgment, the library community is working toward the provision of better institutional guidance for the ethical application of cataloging principles. A new international committee is developing a code of ethics for catalogers which will address key issues [reference the website]. Another resource produced by this committee is a growing cataloging ethics bibliography, providing catalogers a comprehensive curriculum for developing their awareness of the issues at stake and practical solutions for scenarios they may encounter in their work.[[47]](#endnote-47) Keeping abreast of the evolution of ethical authority control practice through a study of the literature, participating in community developments, and applying ethical principles as they are learned will ensure catalogers have the understanding necessary to ethically provide library users with richly connected resources and useful information about the creators of those works.

**Into the future**

Various initiatives and pilot projects look to shape the future of authority control and identity management. Directed by the Library of Congress and contracted with Zepheira, BIBFRAME[[48]](#endnote-48) represents a potential future of bibliographic description that is increasingly plugged into the world of the Semantic Web and linked data. BIBFRAME is a new encoding standard for bibliographic metadata and description that is aimed at replacing the current MARC 21 format. It promises improved interoperability for cooperative cataloging and sharing as well as connecting to broader non-library Web communities. The development of BIBFRAME and other related linked data efforts represents a move away from thinking of bibliographic and authority metadata as carefully crafted records toward a focus on each element or attribute in a metadata record as data that can be combined and mixed in varying ways and levels not typical with current library metadata. This trend towards atomization of metadata records requires more reliance on authority control to provide consistent, predictable library metadata.

The Linked Data for Libraries (LD4L)[[49]](#endnote-49) set of initiatives and grants represents the efforts of major academic institutions, along with the Library of Congress and the PCC to develop guidelines for implementing the future of catalog metadata and description with BIBFRAME at its center in a shared, cooperative library community. Practical efforts center around catalog metadata creation, indexing, searching, and display as well as how larger Web communities like Wikidata connect to these efforts. How authority control will inform and shape this work is an area of future research and exploration.[[50]](#endnote-50)

Recent pilot projects have the potential to shape the future of authority control and authority metadata. The PCC URIs in MARC records pilot[[51]](#endnote-51) initiated by the Library of Congress and the PCC explores applying principles of linked data and the Semantic Web to more consistent and pervasive identifier creation and identity maintenance. The use of these identifiers enables connecting library metadata to the larger Web and Semantic Web communities. For example, the person entity Gottardo Aldighieri is represented in Wikidata (Q550288), ISNI (0000000109223014), and VIAF (87359638). These identifiers can be included in an authority record for this person. These services in turn could include a link to the same entity in an existing cooperative authority database. The PCC Wikidata pilot[[52]](#endnote-52) is exploring the future of identity management by looking at Wikidata both as a source for authority metadata that could enrich existing library metadata and serve as a location for publishing existing authority and bibliographic metadata that would benefit library and non-library communities alike. The shared entity management infrastructure project[[53]](#endnote-53) is a project being developed by OCLC and partners within the library community to create a persistent, shared, and centralized system for managing identifiers and metadata for library information resources. This project aims to create an authoritative database of library metadata to connect library collections to communities and resources on the larger Web and Semantic Web. Just as authority control has evolved and adapted with past technology developments these projects and efforts will continue to press forward in improving the creation, maintenance, and discovery of information resources.

**Conclusion**

As a continually growing and changing database, the library’s catalog requires ongoing maintenance, especially through disciplined authority control practice. While the work can be time-consuming and intellectually demanding, the pay-off for the user experience is incalculable. The authority control landscape is an interconnected network of libraries, vendors, databases, and services. Library patrons of today expect seamless information retrieval and sophisticated navigation. Correct application of authority control best practices assists catalogers in meeting these needs, while connecting users to the most relevant resources for their information search.

**Notes**

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