

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PALO ALTO NETWORKS, INC.,
Petitioner

v.

BT AMERICAS INC.,
Patent Owner

Case No. IPR2023-00888
U.S. Patent No. 7,159,237

DECLARATION OF JAMES L. MULLINS, Ph.D.

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent & Trademark Office
P.O. Box 1450
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PAN EX1018
Palo Alto Networks v. BT Americas
IPR2023-00888

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I, Dr. James L. Mullins, declare as follows:

1. I have personal knowledge of the facts and opinions set forth in this declaration, I believe them to be true, and if called upon to do so, I would testify competently to them.

2. I have been retained by Petitioner Palo Alto Networks, Inc. in the above-captioned *inter partes* review relating to U.S. Patent No. 7,159,237 to provide opinions on various documents.

I. INTRODUCTION

3. I am presently Dean Emeritus of Libraries and Esther Ellis Norton Professor Emeritus at Purdue University. My career as a professional and academic/research spanned more than 44 years including library positions at Indiana University, Villanova University, Massachusetts Institute of Technology, and Purdue University. EX1019 is a true and correct copy of my curriculum vitae describing my background and experience.

4. In 2018, I founded the firm Prior Art Documentation Librarian Services, LLC, located at 205 St. Cuthbert, Williamsburg, VA 23188 after purchasing the intellectual property of and successor to Prior Art Documentation, LLC located at 711 South Race Street, Urbana, IL 61801. Further information about my firm, Prior Art Documentation Librarian Services, LLC (PADLS), is available at www.priorartdoclib.com.

5. I have been retained by Palo Alto Networks, Inc. to offer my opinion on the authenticity and dates of public accessibility of various documents. For this service, I am being paid my usual hourly fee of \$275.00/hour. I have no stake in the outcome of this proceeding or any related litigation or administrative proceedings, and my compensation in no way depends on the substance of my testimony or the outcome of this proceeding.

II. QUALIFICATIONS

6. I received a Bachelor of Arts degree in History, Religion and Political Science in 1972 as well as a Master of Arts degree in Library Science in 1973 from the University of Iowa. I received my Ph.D. in Academic Library Management with a specialization in Law Librarianship in 1984 from Indiana University. Over the past forty-seven years, I have held various positions in the field of library and information sciences.

7. I am presently Dean Emeritus of Libraries and Esther Ellis Norton Professor Emeritus at Purdue University and have been since January 1, 2018. I have been previously employed as follows:

- Dean of Libraries and Professor and Esther Ellis Norton Professor, Purdue University, West Lafayette, IN (2004-2017);
- Assistant/Associate Director for Administration, Massachusetts Institute of Technology (MIT) Libraries, Cambridge, MA (2000-2004);

- University Librarian and Director, Falvey Memorial Library, Villanova University, Villanova, PA (1996-2000);
- Director of Library Services, Indiana University South Bend, South Bend, IN (1978-1996);
- Part-time Instructor, School of Library and Information Science, Indiana University, Bloomington, IN (1979-1996);
- Associate Law Librarian, and associated titles, Indiana University School of Law, Bloomington, IN (1974-1978); and
- Catalog Librarian, Assistant Professor, Georgia Southern College (now University), Statesboro, GA (1973-1974).

8. I am a member of the American Library Association (“ALA”), where I served as the chair of the Research Committee of the Association of College and Research Libraries (“ACRL”). My service to ALA included service on the editorial board of the most prominent library journal, *College and Research Libraries*. I also served on the Standards Committee, College Section of the Association of College and Research Libraries, where I was instrumental in developing a re-issue of the *Standards for College Libraries* in 2000. Over 20 years I was actively engaged in academic library professional associations on the international level including invited papers and lectures in Germany, Norway, Israel, Argentina, Australia, South Africa, New Zealand, Hong Kong, Greece, Canada, France, Belgium, China, Japan,

South Korea, Finland, Sweden, Poland, Switzerland, Singapore, and the United Kingdom.

9. I am an author of numerous publications in the field of library science and have given presentations in library sciences at national and international conferences. During more than 44 years as an academic librarian and library science scholar, I have gained extensive experience with catalog records and online library management systems (LMS) built using Machine-Readable Cataloging (“MARC”) standards. As an academic library administrator, I have had responsibility to ensure that students were educated to identify, locate, assess, and integrate information garnered from research-library resources. I have also facilitated the research of faculty colleagues either directly or through the provision of, and access to, the requisite print and/or digital materials and services at the universities where I worked.

10. Based on my experience identified above and detailed in my curriculum vitae, which is attached hereto as EX1019, I consider myself to be an expert in the field of library science and academic library administration. I have previously offered my opinions on the public availability and authenticity of documents in over 40 cases. I have been deposed in one case.

III. BACKGROUND ON PUBLIC ACCESSIBILITY

A. Scope of This Declaration

11. I am not a lawyer, and I am not rendering an opinion on the legal question of whether a particular document is, or is not, a “printed publication” under the law. I am, however, rendering my expert opinion on the authenticity of the document referenced herein, and when and how this document was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located the document.

12. I am informed by counsel that an item is considered authentic if there is sufficient evidence to support a finding that the item is what it is claimed to be. I am also informed that authenticity can be established based on the contents of the document itself, such as the appearance, content, substance, internal patterns, or other distinctive characteristics of the item.

13. I am informed by counsel that a given reference qualifies as “publicly accessible” if it were disseminated or otherwise made available such that a person interested in and ordinarily skilled in the relevant subject matter could locate it through the exercise of ordinary diligence.

14. While I understand that the determination of public accessibility under the foregoing standard rests on a case-by-case analysis of the facts particular to an individual publication, I also understand that a printed publication is rendered

“publicly accessible” if it is cataloged and indexed by a library such that a person interested in the relevant subject matter could locate it (*i.e.*, I understand that cataloging and indexing by a library is sufficient, though there are other ways that a printed publication may qualify as “publicly accessible”). One manner of sufficient indexing is indexing according to subject matter. I understand that it is not necessary to prove someone actually looked at the printed publication in order to show it was publicly accessible by virtue of a library’s cataloging and indexing thereof. I understand that cataloging and indexing by a single library of a single instance of a particular printed publication is sufficient. I understand that, even if access to a library is restricted, a printed publication that has been cataloged and indexed therein is publicly accessible so long as a presumption is raised that the portion of the public concerned with the relevant subject matter would know of the printed publication. I also understand that the cataloging and indexing of information that would guide a person interested in the relevant subject matter to the printed publication, such as the cataloging and indexing of an abstract for the printed publication, is sufficient to render the printed publication publicly accessible.

15. I understand that evidence showing the specific date when a printed publication became publicly accessible is not necessary. Rather, routine business practices, such as general library cataloging and indexing practices, can be used to

establish an approximate date on which a printed publication became publicly accessible.

B. Materials Considered

16. In forming the opinions expressed in this declaration, I have reviewed the documents, exhibits, and appendices referenced herein. These materials are records created in the ordinary course of business by publishers, libraries, indexing services, and others. From my years of experience, I am familiar with the process for creating many of these records, and I know that these records are created by people with knowledge of the information contained within the record. Further, these records are created with the expectation that researchers and other members of the public will use them. All materials cited in this declaration and its appendices are of a type that experts in my field would reasonably rely upon and refer to in forming their opinions.

C. Person of Ordinary Skill in the Art

17. I have been informed by counsel that the subject matter of this proceeding generally relates to network security.

18. I have been informed by counsel that a “person of ordinary skill in the art at the time of the inventions” (POSITA) is a hypothetical person who is presumed to be familiar with the relevant field and its literature at the time of the inventions. This hypothetical person is also a person of ordinary creativity, and capable of understanding the scientific principles applicable to the pertinent field.

19. I have been informed by counsel that persons of ordinary skill in this subject matter or art would have included someone with a B.S. degree in Computer Science, Computer Engineering, or an equivalent field, as well as at least 2-3 years of academic or industry experience in the design, analysis, and monitoring of computer networks, including issues of network security and network administration, or comparable industry experience.

20. It is my opinion that such a person would have been actively engaged in academic research and learning through study and practice in the field, and possibly through formal instruction through the bibliographic resources relevant to his or her research. By the 2000s, such a person with the educational background and research expectation would have had access to a vast array of print resources, including at least the documents referenced below, as well as to a fast-changing set of online resources.

D. Library Catalog Records and Other Resources

21. Some background on MARC (Machine-Readable Cataloging) formatted records, OCLC, and *WorldCat* is helpful to understand the library catalog records discussed in this declaration. I am fully familiar with the library cataloging standard known as the MARC standard, which is an industry-wide standard method

of storing and organizing library catalog information.¹ MARC practices have been consistent since the MARC format was developed by the Library of Congress in the 1960s, and by the early 1970s became the U.S. national standard for disseminating bibliographic data. By the mid-1970s, MARC format became the international standard, and persists through the present. A MARC-compatible library is one that has a catalog consisting of individual MARC records for each of its items. The underlying MARC format (computer program) underpins the online public access catalog (OPAC) that is available to library users to locate a particular holding of a library. Today, MARC is the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.² The MARC practices discussed below were in place during the late 1990s time frame relevant to the documents referenced herein.

¹ The full text of the standard is available from the Library of Congress at <http://www.loc.gov/marc/bibliographic/> (Appendix A).

² Almost every major library in the world uses a catalog that is MARC-compatible. See, e.g., Library of Congress, *MARC Frequently Asked Questions (FAQ)*, <https://www.loc.gov/marc/faq.html> (Appendix B) (“MARC is the acronym for MACHine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began nearly forty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today.”). MARC is the ANSI/NISO Z39.2-1994 (reaffirmed 2009) standard for Information Interchange Format.

22. Online Computer Library Center (OCLC) is a not-for-profit worldwide consortium of libraries. Similar to MARC standards, OCLC's practices have been consistent from the 1970s through the present. Accordingly, the OCLC practices discussed below were in place during the time frame discussed in Section IV. OCLC was created "to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information."³ Among other services, OCLC and its members are responsible for maintaining the WorldCat database (<http://www.worldcat.org/>), used by libraries throughout the world.

23. Libraries worldwide use the machine-readable MARC format for catalog records. MARC-formatted records include a variety of subject access points

³ OCLC Online Computer Library Center, Inc., *Amended Articles of Incorporation of OCLC Online Computer Library Center, Inc.*, Third Article (OCLC, Dublin, Ohio) Revised November 30, 2016, <https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf> (Appendix C).

based on the content of the document being cataloged. A MARC record for a particular work comprises several fields, each of which contains specific data about the work. Each field is identified by a standardized, unique, three-digit code corresponding to the type of data that follows. For example, a work's title is recorded in field 245, the primary author of the work is recorded in field 100, a work's International Standard Book Number ("ISBN") is recorded in field 020, and the work's Library of Congress call number (assigned by Library of Congress) is recorded in field 050. Some fields can contain subfields, which are indicated by letters. For example, a work's publication date is recorded in field 260 under the subfield "c."

24. The MARC field 040, subfield "a," identifies the library or other entity that created the catalog record in the MARC format. The MARC field 008 identifies the date when this first MARC record was created, most often by the Library of Congress, but in the case of local original cataloging—for example a thesis or dissertation—the degree-granting university library would typically complete the original cataloging, and the date in the 008 field would be the date of cataloging and addition to the university library on-line catalog.

25. MARC records also include several fields that include subject matter classification information. An overview of MARC record fields is available through the Library of Congress at <http://www.loc.gov/marc/bibliographic/>. For example,

6XX fields are termed “Subject Access Fields.”⁴ Among these, for example, is the 650 field; this is the “Subject Added Entry – Topical Term” field. *See* <http://www.loc.gov/marc/bibliographic/bd650.html> (Appendix D). The 650 field is a “[s]ubject added entry in which the entry element is a topical term.” Appendix D, 1. The 650 field entries “are assigned to a bibliographic record to provide access according to generally accepted thesaurus-building rules (e.g., *Library of Congress Subject Headings* (LCSH), *Medical Subject Headings* (MeSH)).” *Id.* Thus, a researcher can easily discover material relevant to a topic of interest with a search using the terms employed in the MARC Fields 6XX.

26. Further, MARC records include call numbers, which themselves include a classification number. For example, the 050 field is dedicated as the “Library of Congress Call Number”⁵ as assigned by the Library of Congress. A defined portion of the Library of Congress Call Number is the classification number, and “source of the classification number is *Library of Congress Classification* and the *LC Classification-Additions and Changes*.” Appendix F, 2. Thus, included in the 050 field is a subject matter classification. As an example: TK5105.59 indicates books on computer networks – security measures. When a local library assigns a

⁴ *See* <http://www.loc.gov/marc/bibliographic/bd6xx.html> (Appendix E).

⁵ *See* <http://www.loc.gov/marc/bibliographic/bd050.html> (Appendix F).

classification number—most often a Library of Congress-derived classification number created by a local library cataloger or a Dewey Decimal classification number, for example, 005.8, computer networks – security measures—it appears in the 090 field. In either scenario, the MARC record includes a classification number in the call number field that represents a subject matter classification.

27. The 9XX fields, which are not part of the standard MARC 21 format,⁶ were defined by OCLC for use by the Library of Congress, processing or holding notes for a local library, and for internal OCLC use. For example, the 955 field is reserved for use by the Library of Congress to track the progress of a new acquisition from the time it is submitted for Cataloging in Publication (CIP) review until it is published and fully cataloged and publicly available for use within the Library of Congress. Fields 901-907, 910, and 945-949 have been defined by OCLC for local use and will pass OCLC validation. Fields 905 or 910 are often used by an individual library for internal processing purposes—for example, the date of cataloging and/or the initials of the cataloger (e.g., MIT Libraries)

28. *WorldCat* is the world's largest public online catalog, maintained by the OCLC, a not-for-profit international library consortium, and built with the records created by the thousands of libraries that are members of OCLC. OCLC

⁶ See <https://www.oclc.org/bibformats/en/9xx.html> (Appendix G).

provides bibliographic and abstract information to the public based on MARC-compliant records through its OCLC *WorldCat* database. *WorldCat* requires no knowledge of MARC tags and code and does not require a login or password. *WorldCat* is easily accessible through the World Wide Web to all who wish to search it; there are no restrictions to be a member of a particular community, etc. The date a given catalog record was created (corresponding to the MARC field 008) appears in some detailed *WorldCat* records as the Date of Entry but not necessarily all. *WorldCat* does not provide a view of the underlying MARC format for a specific *WorldCat* record. In order to see the underlying MARC format, the researcher must locate the book in a holding library listed among those shown in *WorldCat* and search the online public catalog (OPAC) of a holding library. Whereas *WorldCat* records are widely available, the availability of library-specific, MARC-formatted records varies from library to library. When a specific library wishes to make the underlying MARC format available there will be a link from the library's OPAC display, often identified as a MARC record or librarian/staff view.

29. When a MARC record is created by the Library of Congress or an OCLC member institution, the date of creation for that record is automatically populated in the fixed field (008), with characters 00 through 05 in year, month, day

format (YYMMDD).⁷ Therefore, the MARC record creation date reflects the date on which the publication associated with the record was first cataloged. Thereafter, the local library's computer system may automatically update the date in field 005 every time the library updates the MARC record (*e.g.*, to reflect that an item has been moved to a different shelving location within the library, or a reload of the bibliographic data with the introduction of a new library management system that creates and manages the OPAC).

E. Monograph Publications

30. Monograph publications are written on a single topic, presented at length, and distinguished from an article and include books, dissertations, and technical reports. A library typically creates a catalog record when the monograph is acquired by the library. First, it will search OCLC to determine if a record has already been created by the Library of Congress or a contributing member library. If the record is found in OCLC, the record is downloaded into the library's LMS (Library Management System) that typically includes the acquisitions, cataloging, and circulation integrated functions. Once the item is downloaded into the library's LMS, the library adds its identifier to the OCLC database so when a search is

⁷ Some of the newer library catalog systems also include hour, minute, second (HHMMSS).

completed on *WorldCat*, the library will be indicated as an owner of the title. With the creation of the record in the LMS it is searchable and viewable through the library Online Public Access Catalog (OPAC), by author, title, and subject heading, at the library and from anywhere in the world through the internet. The OPAC also connects with the circulation function of the library, which typically indicates whether the book, dissertation, or tech report is available, in circulation, etc., as well as its call number and location in a specific departmental/disciplinary library. The OPAC not only provides immediate bibliographic access on site, but it also facilitates interlibrary loan of items—that is, the loan of an item from one library to another to meet a research need.

F. Dissertation/Thesis Publications

31. Dissertations (doctoral level) and theses (masters and bachelors level) often exist in only one paper copy, held at the institution where it was written and cataloged, and shelved in the institution's archives or special collections. Often, there is only one library record and one holding library, the one in which the degree was granted. An additional copy may be added by another library when a copy is purchased and added to that library collection. Dissertations/theses in the past were made available in print and on microform, however, requested copies are now more often provided as a digital copy. During the past ten years, many institutions no longer require the submission of a hard-copy of the dissertation/thesis, and solely

rely on the digital format. The originating cataloging would typically still be done by the degree-granting institution's library.

G. Ownership and Date Stamp

32. Every library sets its own practice or policy on whether or not to date stamp, but all will have an ownership stamp somewhere in the publication—typically on the cover page, verso of the cover page, or a designated page within the publication, but sometimes even on the top, side, or bottom edge of the monograph. The ownership and date stamp can also vary from one library to another when the date stamp is entered on the monograph. It could occur when received in acquisitions after shipment to the library, or it could be at the time of cataloging. Therefore, there could be instances when the date of receipt precedes the cataloging date or vice versa.

H. Cataloging/Indexing

33. A researcher may discover material relevant to his or her topic in a variety of ways. One common means of discovery is to search for relevant information in an index of periodicals and other publications. Having found relevant material, the researcher will then normally obtain it online, look for it in libraries, or purchase it from the publisher, a bookstore, a document-delivery service, or other provider. Sometimes the date of a document's public accessibility will involve both indexing and library date information. Date information for

indexing entries is, however, often unavailable. This is especially true for online indices.

34. Indexing services use a wide variety of controlled vocabularies to provide subject access and other means of discovering the content of documents. The formats in which these access terms are presented vary from service to service.

35. Online indexing services commonly provide bibliographic information, abstracts, and full-text copies of the indexed publications, along with a list of the documents cited in the indexed publication. These services also often provide lists of publications that cite a given document. A citation of a document is evidence that the document was publicly available and in use by researchers no later than the publication date of the citing document.

IV. OPINION REGARDING AUTHENTICITY AND PUBLIC ACCESSIBILITY

A. Document A: Exhibit 1005, Chu, Yang-hua. *Trust Management for the World Wide Web*. Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, 1997 (“Chu”).

1. Authenticity

36. I have been asked to opine on a thesis authored by Yang-hua Chu, titled *Trust Management for the World Wide Web*, submitted to the Department of Electrical Engineering and Computer Science in Partial Fulfillment of the Requirements for the Degree of Master of Engineering in Electrical Engineering and

Computer Science at the Massachusetts Institute of Technology, June 13, 1997

(“Chu”).

37. As stated above, I was a librarian and administrator at the MIT Libraries from the end of 2000 until mid-2004, therefore, shortly before the time that Chu would have submitted his thesis in print for approval for the degree of Master of Engineering, as well as during the time when the thesis would have been processed, including cataloging, stamping, and copying to microfilm. The process for cataloging/indexing theses had been in practice well before my arrival at MIT, and therefore, I have no doubt that the process and procedures I observed during my tenure at the MIT Libraries would have been in place in 1997-1998.

38. In 1997-1998, the print copy of Chu would have been sent to the Barker Library for shelving once it was cataloged/indexed and labeled. With the introduction of DSpace@MIT in the early 2000s, theses that had not been submitted digitally were then scanned and entered into *DSpace@MIT*, which now provides digital access to Chu as it was received by MIT Libraries. The print copies held in the disciplinary libraries, such as the Barker Engineering Library, were then sent to the Institute Archives for permanent shelving. A microform copy was retained in the Barker Library for access prior to the development of *DSpace@MIT*.

39. Exhibit 1020 is the descriptive page of Chu that appears as the *DSpace@MIT* digital copy of Chu that I downloaded on June 14, 2022 at the following URL: <https://dspace.mit.edu/handle/1721.1/43534>.

40. Exhibit 1005 shows the complete Chu thesis, which I downloaded on June 14, 2022, from *DSpace@MIT* at the following URL:
<https://dspace.mit.edu/bitstream/handle/1721.1/43534/38271519-MIT.pdf?sequence=2&isAllowed=y>.

41. On the first page of Exhibit 1005 is a stamp that reads “OCT 29 1997” (see below). From my knowledge of the process for processing and cataloging materials at the MIT Libraries, this is the date Chu was received by the MIT Libraries, and was then ready for cataloging/indexing.



EX1005, 1 (excerpt).

42. The stamp above is consistent with my knowledge and experience of the stamps applied by the MIT Libraries, and consistent with its policy and practice.

43. Exhibit 1021 includes a download from the MIT Libraries OPAC. The MIT OPAC record indicates that Chu is “Available Online” and shows “Online Availability - MIT Theses in DSpace.” EX1021, 1. The MIT OPAC record further indicates availability at the following locations: “Barker Library – Available,

Microforms ; THESIS Thesis E.E. 1997 M.Eng”; “Institute Archives – Available, Microforms ; THESIS Thesis E.E. 1997 M.Eng”; and “Institute Archives – Noncirculating Collection 3 : THESIS Thesis E.E. 1997 M.Eng.” *Id.*

44. Verification provided in this OPAC record reflects Chu is shown by:
Title: *Trust Management for the World Wide Web*; Author: Chu, Yang-hua;
Dissertation: M. Eng. Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science; 1997. *Id.*, 2.

45. Having located Chu through the MIT Libraries OPAC, Exhibit 1021 (which indicates that it is held in the Barker Engineering Library in microform with the call number THESIS E.E. 1997 M.Eng; held in paper in the Institute Archives in the Noncirculating Collection 3; THESIS Thesis E. E. 1997 M. Eng; and is accessible through a direct link from the MIT Libraries OPAC to DSPACE@MIT, a repository created and verified by the MIT Libraries), I affirm that Chu is an authentic document, and the label, stamping and processing is consistent with what I observed when I was a librarian and administrator at MIT Libraries.

2. Public Accessibility

46. The print thesis would have been sent by the Department of Electrical Engineering and Computer Science to the Massachusetts Institute of Technology Libraries after it was approved by the supervising committee in September 1997.

47. Exhibit 1022 is the online public access catalog (OPAC) MARC record at MIT Libraries. This record provides author (MARC field 100) and title (MARC field 245) access to Chu using the OPAC at MIT Libraries as well as through OCLC's *WorldCat*. See EX1023; EX1024. This indicates that Chu was cataloged and searchable by author and title.

48. I downloaded Exhibit 1022, the MARC record for Chu, from the MIT Libraries OPAC on June 14, 2022. On this record there appears the 008 MARC field. The 008 field is the date when a book was originally cataloged. Typically, original cataloging for a published monograph is performed by the Library of Congress. In this instance, as an MIT thesis, the original cataloging was the responsibility of the MIT Libraries, typical for the cataloging of a thesis or dissertation (a single, unique local publication).

49. The dates in the 008 MARC field reads: *980127s1997*, 98=1998; 01=January; 27=27th day of January – January 27th, 1998. Once Chu was cataloged, it was immediately available in the MIT Libraries OPAC. Therefore, Chu was cataloged and entered into the MIT Libraries OPAC on January 27, 1998.

50. Although no subject headings were assigned to Chu (MARC Fields 650s), it would have been possible to do a keyword search in the MIT Libraries OPAC. This keyword search could be further limited by other filter criteria such as format (e.g., print), and type of publication (e.g., thesis).

51. Exhibit 1023 is a screen scrape I did from the MIT Libraries OPAC (“Barton”) on June 16, 2022. By using the Advanced Search Option, limiting the search to “Print/physical items” and “Theses/dissertations,” and the keywords, “Trust Management” in any field, 142 results were recovered. First on the list was Chu.

52. In a research university library, from my experience and observation of original cataloging at MIT Libraries, the cataloging of dissertations/theses required the knowledge and time of a highly qualified original cataloger. Original cataloging requires more time than does adding a book to the OPAC where the bibliographic record is readily available and useable. The length of time required for cataloging a thesis, thereby, creates a backlog, and increases the time from receipt in the library to public access on the library shelf.

53. Therefore, the fact that Chu was stamped as received by the MIT Libraries on October 29, 1997 and cataloged on January 27, 1998 is a typical delay from the time of receipt by the library until cataloging. Chu would have been available in the Barker Engineering Library within one week to ten days following cataloging, due to labeling and transfer to the Barker Library—that is, no later than February 4, 1998. However, if a researcher knew of the dissertation/thesis, the researcher could have requested Chu at the Barker Engineering Library within a few days after the stamp date of October 29, 1997 and it would have been retrieved for

immediate access. I observed this practice while a librarian and administrator at the MIT Libraries.

54. Therefore, as of January 27, 1998, Chu was indexed by author, title, and keyword, and therefore could easily be searched for and located in the OPAC of the MIT Libraries and through the internet anywhere in the world on OCLC's bibliographic database. Once the original cataloging record was completed by the MIT Libraries cataloger, it was then uploaded into OCLC's bibliographic database.

55. Exhibit 1025 is the OCLC database *WorldCat* entry for Chu that I downloaded on June 14, 2022. The *WorldCat* holding record shows Chu was held by only one library, MIT Libraries, which would be expected for a thesis since typically theses are held by only the degree-granting institution. This search on *WorldCat* could have been completed by accessing *FirstSearch* (the predecessor to *WorldCat*) from anywhere in the world through an institutional member library of OCLC, Inc.

56. Exhibit 1026 is a download of the results on *WorldCat* when I entered as a string: "Trust Management World Wide Web" (see complete string just above the results). The search was limited to "Thesis/dissertation" with the results indicating 572 items met these keyword terms. On the list, number 20 is Chu. A researcher, therefore, not knowing the author or title, by entering the terms: "Trust

Management World Wide Web,” and limiting the search to theses/dissertations, could have retrieved Chu.

3. Conclusion of Authenticity and Public Accessibility

57. Based on the evidence presented here—thesis completed in September 1997 with receipt by the MIT Libraries on October 29, 1997, and later made accessible digitally in *DSpace@MIT*, I have no doubt that Chu is an authentic document.

58. Once original cataloging was completed on January 27, 1998, Chu would have been accessible in the MIT Libraries OPAC as well as in OCLC’s bibliographic database *FirstSearch/WorldCat*.

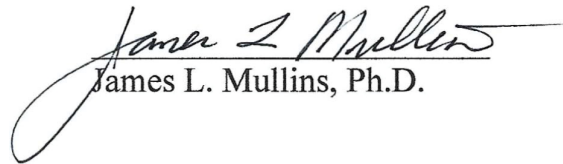
59. It is my opinion that Chu is an authentic document and was publicly accessible through the MIT Libraries OPAC and OCLC’s *FirstSearch/WorldCat* no later than January 27, 1998. Chu would have been available in print at the Barker Engineering Library upon request no later than February 4, 1998.

V. CONCLUSION

60. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me.

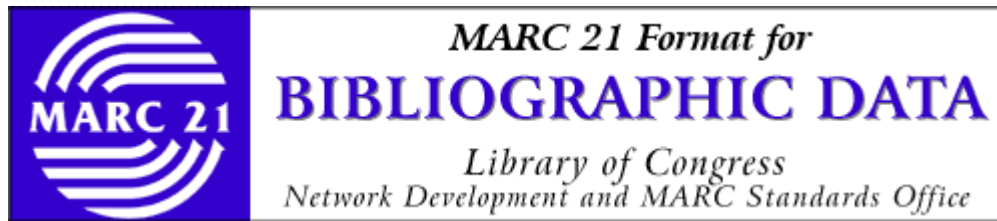
61. I hereby declare that all statements made herein are made of my own knowledge and are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on this 18th day of June, 2022 in Williamsburg, Virginia


James L. Mullins, Ph.D.

APPENDIX A

[Library of Congress](#) >> [MARC](#) >> **Bibliographic**



1999 Edition

Update No. 1 (October 2000) through Update No. 34 (July 2022)

This online publication provides access to both the full and concise versions of the *MARC 21 Format for Bibliographic Data*. The "full" bibliographic format contains detailed descriptions of every data element, along with examples, input conventions, and history sections. The "concise" bibliographic format contains abridged descriptions of every data element, along with examples. The full and concise versions are identified in the header of each field description.

Changes to the *MARC 21 Format for Bibliographic Data* that resulted from Update No. 34 (July 2022) are displayed in **red** print. The date located in the header of the full version of each field indicates the last month and year of update.

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APPENDIX B



MARC STANDARDS

Frequently Asked Questions (FAQ)

Network Development and MARC Standards Office
Library of Congress

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General Information

What is MARC 21? What does the acronym “MARC” mean?

MARC is the acronym for MACHine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began nearly forty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today. MARC became USMARC in the 1980s and MARC 21 in the late 1990s.

How does MARC 21 differ from the USMARC and CAN/MARC formats?

MARC 21 is not a new format. After having discussions and making minor changes to both formats that accommodated USMARC and CAN/MARC users' specific needs, the USMARC and CAN/MARC (Canadian MARC) formats were “harmonized” into MARC 21 in 1997. See [//www.loc.gov/marc/annmarc21.html](http://www.loc.gov/marc/annmarc21.html) for more information about the harmonization.

Who maintains the MARC 21 formats?

The Network Development and MARC Standards Office at the Library of Congress and the Standards and the Support Office at the Library and Archives Canada maintain the MARC 21 formats. Input for development is provided by MARC 21 users from around the world, including libraries, library networks and utilities, and library system vendors. See [//www.loc.gov/marc/overview.html](http://www.loc.gov/marc/overview.html) for more information about the development and maintenance of the formats.

What are the Network Development and MARC Standards Office and the Standards Division?

The [Network Development and MARC Standards Office](http://www.loc.gov/marc/ndmso/) plans and develops library and information network standards at the Library of Congress. It is the maintenance agency for several national standards, including the MARC 21 formats. To contact it, please e-mail ndmso@loc.gov.

The [Standards Division](http://www.bac-lac.gc.ca/standards/) at the Library and Archives Canada maintains and supports the MARC 21 formats and other library standards. To contact it, please e-mail BAC.Normesdecatalogage-Cataloguingstandards.LAC@canada.ca.

Are there any discussion groups or forums for the MARC 21 formats?

The [MARC Forum](http://www.loc.gov/marc/forum/) is a listserv maintained by the Network Development and MARC Standards Office and is open to anyone interested in the implementation, maintenance and development of the MARC 21 formats. The forum provides an opportunity for members of the information community to participate in discussions related to the formats. Vendor, network, technical service, automation, and reference staff and researchers are encouraged to participate. While there is a close linkage between MARC 21 and the cataloging of materials, the focus of the forum is on the use of MARC 21 as a communications format.

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MARC 21 Documentation

What documentation is available and how do I obtain it?

The [MARC Standards](#) page has links to both extensive documentation on MARC 21, including both the full and concise formats, code and field lists, information about MARC 21 development, and documentation to help users with the MARC 21 format. There is a [format overview](#) listing changes to MARC documentation. Some documentation is also available in [translation](#). A [bibliography](#) is also available on the Library's MARC Standards webpage.

Documentation of French versions of some of the formats in Canada is available at [Library and Archives Canada](#).

How often is MARC 21 documentation updated?

The MARC 21 formats are updated two times per year, in the spring and fall. Other documentation is updated as it becomes necessary.

May I use excerpts from MARC 21 documentation?

Using excerpts is permissible as long as credit is given.

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MARC 21 Tutorials

Is there a tutorial for the MARC 21 formats?

[Understanding MARC Bibliographic](#) is a good introduction to the MARC 21 bibliographic format and includes a bibliography, discussion questions and examples. It is widely used and has been translated into several different languages.

[Understanding MARC Authority Records](#) is a good introduction to the MARC 21 authority format and includes a bibliography, discussion questions and examples.

Both *Understanding MARC Bibliographic* and *Understanding MARC Authority Records* are also available as booklets from the [Cataloging Distribution Service](#).

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MARC 21, SGML, XML and other metadata standards

Are SGML or XML versions of the MARC 21 formats available?

The Network Development and MARC Standards Office has developed a framework for working with MARC data in a XML environment. This framework is intended to be flexible and extensible, allowing users to work with MARC data in ways that meet their specific needs. The framework contains many components such as schemas, stylesheets, and software tools developed and maintained by the Library of Congress. Conversion utilities between MARC (ISO 2709) and MARCXML are also available. Please see www.loc.gov/marc/marcxml.html.

The Network Development and MARC Standards Office also developed a MARC to SGML and SGML to MARC conversion program. The following documents contain the program and additional information:

- [MARC DTDs: Background and Development](#)
- [MARC DTDs: Beta Test Version](#)
- [MARC-SGML and SGML-MARC Conversion Program User Guide](#)
- [MARC-SGML and SGML-MARC Conversion Programs Maintenance Guide](#)

A list of some tools that work with HTML, SGML and XML applications is at [//www.loc.gov/marc/marctools.html](http://www.loc.gov/marc/marctools.html).

Is MARC 21 mapped to other metadata standards? Are other standards mapped to MARC 21?

MARC 21 has been mapped to the following metadata standards:

- [MODS](#)
- [Dublin Core](#)
- [MARC Character Sets to UCS/Unicode](#)
- [Digital Geospatial Metadata](#)
- [RDA](#) (See Tools tab)

The following metadata standards have been mapped to MARC 21:

- [MODS](#)
- [Dublin Core](#)
- [UNIMARC to MARC 21](#)
- [ONIX](#)
- [Digital Geospatial Metadata to MARC](#)
- [RDA](#) (See Tools tab)

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MARC 21 Translations

Are there any translations of the MARC 21 formats?

The [MARC 21 Translations](#) page contains a list of documents that are either direct translations or close adaptations of the MARC 21 formats and other MARC documentation. Where applicable, information regarding differences between the translations and MARC 21 is provided. The formats are listed alphabetically by the language of each translation and include full bibliographic citations and contact information.

I would like to translate a MARC 21 publication. What should I do?

Translations of the MARC 21 formats and other MARC documentation are greatly encouraged because of their usefulness to the entire MARC 21 community. The [Network Development and MARC Standards Office](#) does ask that intellectual credit information be included in the translation. The following statement is recommended:

“The MARC 21 [insert name of publication that was translated] was originally prepared by the Network Development MARC Standards Office, Library of Congress and the Standards Division, Library and Archives Canada. It has been translated with permission.”

Once you complete your translation, please send the Network Development and MARC Standards Office an official announcement that includes your publication's bibliographic information and contact information on obtaining copies. If possible, send a printed copy for our collection of translations. If the translation is available on the Internet, please include its URL for inclusion on the [MARC 21 Translations](#) page. Listing a translation is not mandatory; however translations are extremely useful to other MARC 21 users.

A [Translators's Tools](#) page contains additional information about translating MARC 21 documents.

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Tools, Systems and Services That Work With MARC 21

Is there a list of tools compatible with the MARC 21 formats?

A list of some of the bibliographic tools that support the MARC 21 formats is at www.loc.gov/marc/marctools.html. It includes software programs that provide enhanced usability to MARC 21 records and systems. Some of the tools are freeware or open source.

Is there a list of MARC 21 record services?

A list of some of the record services that support the MARC 21 formats is at www.loc.gov/marc/marcrcsvrs.html. It includes services that distribute MARC 21 records, such as records for copy cataloging, records supplied with materials, records used for recon purposes, updated records, conversion services, etc.

What systems are compatible with the MARC 21 formats?

A list of some of the systems that support the MARC 21 formats is at www.loc.gov/marc/marcsysvend.html. The list includes systems that collect, organize and manage MARC 21 records.

How do I add a record service, vendor system or tool to these lists?

Vendors, software producers, and anyone else who provides vendor records, system services, or who has developed specialized MARC tools, are encouraged to fill out a [submission form](#).

Please note: Individuals who submit the form on someone else's behalf should put their contact information in the "Citation Contact" field and the name of the individual/company on whose behalf the form is submitted in the "Product Contact" field.

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Making Changes to the MARC 21 Formats and Code Lists

How do I report errors in MARC 21 documentation?

If you notice an error or omission in either the print or online MARC 21 documentation, please contact ndmso@loc.gov. Describe the error and where it occurs. Please be as specific as possible.

How do I propose making a change to the MARC 21 formats?

Proposals for changes to the formats may originate from any MARC 21 user. Please either fill out the [MARC 21 Formats Proposed Change Form](#) or contact the [Network Development and MARC Standards Office](#) at the Library of Congress or the [Standards division](#) at the Library and Archives Canada. Maintenance agency staff at the Library of Congress and the Library and Archives Canada write, edit and review proposals and discussion papers twice a year and distribute them via the [MARC Forum listserv](#) and the MARC Standards web site. Discussions at the semiannual [MARBI \(Machine-Readable Bibliographic Information\)](#) meetings in the United States and the annual [CCM \(Canadian Committee on MARC\)](#) meeting in Canada, along with suggestions received by e-mail and the listserv, are used by the maintenance agencies to make final decisions on the proposals.

How do I request new or revised MARC 21 organization codes?

Before requesting a MARC 21 organization code, please first search the [MARC Code List for Organizations](#). If you do not find a code for your organization, click on one of these links to access a request form in the language of your choice.

[\[ENGLISH\]](#) [\[ESPAÑOL\]](#) [\[PORTUGUÊS\]](#)

You may use the online form to request up to three codes. If more than three codes are needed, please submit a list of the organizations with their names and addresses (including street, city, state, postal code, and country) via email to ndmso@loc.gov. Please include contact information. Note: Attachments to e-mail messages are not accepted.

The *MARC Code List for Organizations* is updated frequently, as codes are often added. Since information in a request must be verified and then incorporated into the list, there is a short delay between the time of the request and the appearance of a newly-assigned code in the database. Names and addresses are revised when changes are reported.

Requests for the assignment of new codes or changes involving organizations in Canada should be sent to the [Interlibrary Loan Division](#) at the Library and Archives Canada.

Requests for the assignment of new codes or changes involving organizations in the United Kingdom should be sent to the [UK National Agency for MARC Organisation Codes](#) at the British Library.

Requests for the assignment of new MARC organization codes or for changes to codes may also be sent via fax to +1-202-707-0115 or by surface mail to:

Library of Congress
Network Development and MARC Standards Office
101 Independence Avenue, S.E.
Washington, DC, 20540-4402 USA

How do I request MARC 21 relator, sources or description convention codes?

Requests for relators, sources or description convention codes should be sent to ndmso@loc.gov.

Requests can also be faxed to +1-202-707-0115 or sent by surface mail to:

Library of Congress
Network Development and MARC Standards Office
101 Independence Avenue, S.E.
Washington, DC, 20540-4402 USA

Requests should include a full bibliographic citation and a scan, photocopy or Internet link for the item to be added.

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Record Requirements and Record and File Specifications for MARC 21

Where do I find the U.S. National Level/Minimal Level Record Requirements for the MARC 21 formats?

There is no list of of “mandatory” data elements that must appear in a MARC 21 record. Thereotically, a record could simply consist of a leader and a 245 (title) field. However, there is a list of the MARC 21 data elements required to meet minimal and national level requirements in the United States for the [bibliographic](#) and [authority](#) formats. Please note that other countries may have different lists of required data elements.

What are the appropriate record and file specifications for the formats?

Information about the file specifications for the MARC 21 formats is in [MARC 21 Specifications for Record Structure, Character Sets, and Exchange Media](#). This document is also available from the [Cataloging Distribution Service](#). For a basic introduction to MARC 21 file and record structure, you may also want to look at [Understanding MARC Bibliographic](#).

What are the specifications for character sets?

MARC 21 records intended for broad, standard interchange should be encoded according to the following specifications. Either an 8-bit based encoding system (called MARC-8 in MARC 21 documentation) or a variable 8/16-bit encoding following ISO/IEC 10646 (UCS) and Unicode UTF-8 encoding rules (called UCS/Unicode UTF-8 in MARC 21 documentation) may be used.

A very large repertoire of characters is defined for use in the MARC-8 environment. For standard MARC 21 interchange, the use of UCS/Unicode UTF-8 is limited to this same repertoire, a subset of UCS/Unicode. This is necessary for interchange until all systems fully accommodate the complete UCS/Unicode repertoire of characters. This restriction will be periodically reviewed as the character encoding environment develops.

Please see [//www.loc.gov/marc/specifications/speccharintro.html](http://www.loc.gov/marc/specifications/speccharintro.html) for detailed information on MARC 21 character sets.

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Electronic resources and MARC 21

How do I code electronic resources in a MARC 21 record?

The document [Guidelines for Coding Electronic Resources in Leader/06](#) assists users coding fixed fields in records for electronic resources. [Guidelines for the Use of Field 856](#) provides guidance on using field 856 (Electronic location and access) in all the MARC 21 formats. [Guidelines for Distinguishing Cartographic Electronic Resources from other Electronic Resources](#) assists catalogers working with cartographic electronic resources.

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Go to:

- [MARC Standards Home Page](#)
- [Library of Congress Home Page](#)



Library of Congress

[Library of Congress Help Desk](#) (07/12/2006)

APPENDIX C

AMENDED ARTICLES OF INCORPORATION

OF

OCLC, Inc.

- FIRST The name of the corporation shall be OCLC, Inc. (the "Corporation").
- SECOND The place in this State where the principal office of the Corporation is to be located is in the City of Dublin, Franklin County, Ohio.
- THIRD The purpose or purposes for which the Corporation is formed are to establish, maintain, and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary, and educational knowledge and information.
- FOURTH The affairs of the Corporation shall be managed by the Board of Trustees. The qualifications of the Trustees, together with their terms of office, manner of election, removal, change of number, filling of vacancies and of newly-created trusteeships, powers, duties and liabilities, shall, except as otherwise provided in these Articles, or by the laws of the State of Ohio, be as prescribed by the Code of Regulations.
- FIFTH There shall be two classes of members of the Corporation and they shall be OCLC Members, and Trustee Members. The voting powers of each class of members shall be only as defined in the Code of Regulations or as stated in these Articles.
- SIXTH There shall be a Global Council composed of Member Delegates as prescribed in the Code of Regulations.
- SEVENTH These Articles may be amended at any business meeting of the Trustee Members called for that purpose provided that notice of the proposed amendment(s) has been sent to the Trustee Members at least ten (10) days prior to said meeting. A two-thirds (2/3) vote of all of the authorized Trustee Members of the Corporation is required for approval.
- EIGHTH The duration of the Corporation shall be perpetual.
- NINTH No part of the earnings, dues, or receipts of the Corporation shall inure to the benefit of or be distributed to its members, trustees, officers, or other private persons, except only that the Corporation shall be authorized and empowered to pay reasonable compensation for services rendered and expenses incurred and to make payments or distributions in furtherance of the purposes set forth in Article Third hereof. No substantial part of the activities of the Corporation shall be the carrying on of propaganda, or otherwise attempting to influence legislation, and the Corporation shall not participate in, or intervene in (including the publishing or distribution of statements) any political campaign on behalf of, or in opposition to, any candidate for public office. Notwithstanding any other provision of these Articles, the Corporation shall not carry on any other activities not permitted to be carried on (a) by a corporation exempt from Federal income

tax under Section 501(c)(3) of the Internal Revenue Code of 1986, as amended (or the corresponding provision of any future United States internal revenue law) (the "Code") or (b) by a corporation, contributions to which are deductible under Section 170(c)(2) of the Code.

TENTH Upon the dissolution of the Corporation, the Board of Trustees shall, after paying or making provision for the payment of all of the liabilities of the Corporation, dispose of all of the assets of the Corporation exclusively for the purposes of the Corporation in such manner, or to such organization or organizations as are described in Section 170(c)(1) or (2) of the Code, as the Board of Trustees shall determine. Any of such assets not so disposed of shall be disposed of by the Court of Common Pleas of the county in which the principal office of the Corporation is then located, exclusively for such purposes or to such organization or organizations, as said Court shall determine, which are organized and operated exclusively for such purposes.

ELEVENTH These Articles supersede all prior Articles or Amended Articles.

APPENDIX D

650 - Subject Added Entry-Topical Term (R)

MARC 21 Bibliographic - Full

July 2022

First Indicator

Level of subject

- # - No information provided
- 0 - No level specified
- 1 - Primary
- 2 - Secondary

Second Indicator

Thesaurus

- 0 - Library of Congress Subject Headings
- 1 - LC subject headings for children's literature
- 2 - Medical Subject Headings
- 3 - National Agricultural Library subject authority file
- 4 - Source not specified
- 5 - Canadian Subject Headings
- 6 - Répertoire de vedettes-matière
- 7 - Source specified in subfield \$2

Subfield Codes

Main term portion

- \$a - Topical term or geographic name entry element (NR)
- \$b - Topical term following geographic name entry element (NR)
- \$c - Location of event (NR)
- \$d - Active dates (NR)
- \$e - Relator term (R)
- \$g - Miscellaneous information (R)
- \$4 - Relationship (R)

Control subfields

- \$0 - Authority record control number or standard number (R)
- \$1 - Real World Object URI (R)
- \$2 - Source of heading or term (NR)
- \$3 - Materials specified (NR)
- \$6 - Linkage (NR)
- \$7 - Data provenance (R)**
- \$8 - Field link and sequence number (R)

Subject subdivision portion

- \$v - Form subdivision (R)
- \$x - General subdivision (R)
- \$y - Chronological subdivision (R)
- \$z - Geographic subdivision (R)

FIELD DEFINITION AND SCOPE

Subject added entry in which the entry element is a topical term.

Topical subject added entries may consist of general subject terms including names of events or objects. Subject added entries are assigned to a bibliographic record to provide access according to generally accepted thesaurus-building rules (e.g., *Library of Congress Subject Headings* (LCSH), *Medical Subject Headings* (MeSH)). Field 650 may be used by any institution assigning subject headings based on the lists and authority files identified in the second indicator position or in subfield \$2 (Source of heading or term).

A title (e.g., Bible and atheism), a geographic name (e.g., Iran in the Koran), or the name of a corporate body (e.g., Catholic Church and humanism) used in a phrase subject heading are also recorded in field 650.

GUIDELINES FOR APPLYING CONTENT DESIGNATORS

■ INDICATORS

First Indicator - Level of subject

Used to distinguish primary and secondary descriptors.

- No information provided

0 - No level specified

Level of the subject term could be determined but is not specified.

650 00\$aFlour industry\$vPeriodicals.

1 - Primary

Main focus or subject content of the material.

650 17\$aCareer Exploration.\$2ericd

650 #7\$aCareer Exploration.\$2ericd

650 17\$aCooks.\$2ericd

2 - Secondary

Less important aspect of the content of the material.

650 27\$aFood Service.\$2ericd

650 27\$aJunior High Schools.\$2ericd

650 27\$aSimulation.\$2ericd

[Primary and secondary subject content identified.]

Second Indicator - Thesaurus

Subject heading system or thesaurus used in constructing the subject heading.

0 - Library of Congress Subject Headings

Subject added entry conforms to and is appropriate for use in the *Library of Congress Subject Headings* (LCSH) and the Name authority files that are maintained by the Library of Congress.

1 - LC subject headings for children's literature

Subject added entry conforms to the "AC Subject Headings" section of the *Library of Congress Subject Headings* and is appropriate for use in the LC Annotated Card Program.

2 - Medical Subject Headings

Subject added entry conforms to and is appropriate for use in the National Library of Medicine authority files.

3 - National Agricultural Library subject authority file

Subject added entry conforms to and is appropriate for use in the National Agricultural Library subject authority file.

4 - Source not specified

Subject added entry conforms to a controlled list that cannot be identified by second indicator values 0-3, 5-6 or by a code in subfield \$2. Field 653 (Index Term-Uncontrolled) is used to record terms that are not derived from controlled subject heading lists.

5 - Canadian Subject Headings

Subject added entry conforms to and is appropriate for use in the *Canadian Subject Headings* that is maintained by the Library and Archives Canada.

6 - Répertoire de vedettes-matière

Subject added entry conforms to the *Répertoire de vedettes-matière* that is maintained by the Bibliothèque de l'Université Laval and/or name authority files maintained by libraries in Canada using French as the language of description.

7 - Source specified in subfield \$2

Subject added entry conforms to a set of subject heading system/thesaurus building rules. The identifying code is given in subfield \$2.

■ SUBFIELD CODES**\$a - Topical term or geographic name entry element**

Topical subject or a geographic name used as an entry element for a topical term. Parenthetical qualifying information associated with the term is not separately subfield coded.

650 #0\$aAmish.

650 #0\$aKalmyk cattle.

650 #0\$aAstronauts.

650 #0\$aEgypt in the Bible.

650 #0\$aBASIC (Computer program language)

650 #0\$aBull Run, 2d Battle, 1862.

650 #0\$aConcertos (String orchestra)

650 #0\$aVocal music\$zFrance\$y18th century.

650 #0\$aDentistry\$vJuvenile films.

650 #5\$aCanadian wit and humor (English)

\$b - Topical term following geographic name entry element

Topical term that is entered under a geographic name contained in subfield \$a. This construction is not used in AACR2 formulated records.

650 #0\$aCaracas.\$bBolivar Statue.

\$c - Location of event**\$d - Active dates**

Time period during which an event occurred.

\$e - Relator term

Specifies the relationship between the topical heading and the described materials, e.g., depicted.

650 #0\$aSeabiscuit (Race horse),\$edepicted.
[Photograph of Seabiscuit, the race horse.]

650 #0\$aUnicorns,\$edepicted.
[Bayeux Tapestry, showing a unicorn.]

\$g - Miscellaneous information

Data element that is not more appropriately contained in another defined subfield.

\$v - Form subdivision

Form subdivision that designates a specific kind or genre of material as defined by the thesaurus being used. Subfield \$v is appropriate only when a form subject subdivision is added to a main term.

650 #0\$aScuba diving\$vPeriodicals.

650 #0\$aVomiting\$xTreatment\$vHandbooks, manuals, etc.

\$x - General subdivision

Subject subdivision that is not more appropriately contained in subfields \$v (Form subdivision), \$y (Chronological subdivision), or \$z (Geographic subdivision). Subfield \$x is appropriate only when a general topical subdivision is added to a main term.

650 #0\$aRacetracks (Horse-racing)\$zUnited States\$xHistory.

650 #0\$aNumismatics\$xCollectors and collecting.

\$y - Chronological subdivision

Subject subdivision that represents a period of time. Subfield \$y is appropriate only when a chronological subject subdivision is added to a main term.

650 #0\$aMusic\$y500-1400.

\$z - Geographic subdivision

Geographic subject subdivision. Subfield \$z is appropriate in field 650 only when a geographic subject subdivision is added to a main term.

650 #0\$aWorld War, 1939-1945\$xCampaigns\$zTunisia.

650 #0\$aReal property\$zMississippi\$zTippah County\$vMaps.

\$0 - Authority record control number or standard number

See description of this subfield in Appendix A: [Control Subfields](#).

\$1 - Real World Object URI

See description of this subfield in Appendix A: [Control Subfields](#).

\$2 - Source of heading or term

MARC code that identifies the source list from which the subject added entry was assigned. It is used only when the second indicator position contains value 7 (Source specified in subfield \$2). Code from: [Subject Heading and Term Source Codes](#).

650 #7\$aEducational buildings\$zWashington (D.C.)\$y1890-1910.\$2lctgm

650 17\$aAcoustic measurement.\$2test

\$3 - Materials specified

Part of the described materials to which the field applies.

\$4 - Relationship

Code or URI that specifies the relationship from the entity described in the record to the entity referenced in the field. A source of relationship codes is: [MARC Code List for Relators](#).

\$6 - Linkage

See description of this subfield in Appendix A: [Control Subfields](#).

\$7 - Data provenance

See description of this subfield in Appendix J: [Data Provenance Subfields](#).

\$8 - Field link and sequence number

See description of this subfield in Appendix A: [Control Subfields](#).

INPUT CONVENTIONS

Ambiguous Headings - See [Appendix E](#).

Punctuation - Field 650 ends with a mark of punctuation or a closing parenthesis. If the final subfields are subfield \$2 or \$3, the mark of punctuation precedes those subfields.

650 17\$aCareer Exploration.**\$2**ericd

650 #0\$aBallads, English**\$z**Hudson River Valley (N.Y. and N.J.)

Main term portion followed by a subject subdivision does not end with a mark of punctuation unless the main term portion ends with an abbreviation, initial/letter, or open date.

650 #0\$aRain and rainfall**\$z**Washington (State)**\$z**Seattle**\$v**Maps.

Spacing - No spaces are used in initialisms, acronyms, or abbreviations.

650 #0\$aMARC formats.

650 #0\$aC.O.D. shipments.

Display Constant

- *[dash associated with the content of subfield \$v, \$x, \$y, or \$z]*

Dash (-) that precedes a subject subdivision in an extended subject heading is not carried in the machine-readable record. It may be system generated as a display constant associated with the content of subfield \$v, \$x, \$y, and \$z.

Content designated field :

650 #0\$aNuclear energy**\$x**History.

Display example:

Nuclear energy-History.

Initial Article - Initial articles (e.g., The) occurring at the beginning of topical subject added entry fields are usually omitted in most languages (except when the intent is to file on the article).

Any diacritics and/or special characters occurring at the beginning of fields are retained. Note that such characters are usually ignored for purposes of sorting and filing.

CONTENT DESIGNATOR HISTORY

\$b - Topical term following geographic name as entry element [OBSOLETE, 1981]

Subfield was restored for use in retrospective record conversion in 1987.

\$g - Miscellaneous information [NEW, 2014]

\$0 - Authority record control number [NEW, 2007]

\$0 - Authority record control number [REDEFINED, 2010]

\$1 - Real World Object URI [NEW, 2017]

\$4 - Relator code [NEW, 2005]

\$4 - Relator code [RENAMED, 2017] [REDESCRIBED, 2017]

Subfield \$4 was renamed and redescribed to allow for the recording of relationship URIs in addition to MARC and non-MARC codes.

\$7 - Data provenance [NEW, 2022]

APPENDIX E

6XX - Subject Access Fields-General Information

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600 - Subject Added Entry - Personal Name (R)
610 - Subject Added Entry - Corporate Name (R)
611 - Subject Added Entry - Meeting Name (R)
630 - Subject Added Entry - Uniform Title (R)
647 - Subject Added Entry - Named Event (R)
648 - Subject Added Entry - Chronological Term (R)
650 - Subject Added Entry - Topical Term (R)
651 - Subject Added Entry - Geographic Name (R)
653 - Index Term - Uncontrolled (R)
654 - Subject Added Entry - Faceted Topical Terms (R)
655 - Index Term - Genre/Form (R)
656 - Index Term - Occupation (R)
657 - Index Term - Function (R)
658 - Index Term - Curriculum Objective (R)
662 - Subject Added Entry - Hierarchical Place Name (R)
688 - Subject Added Entry - Type of Entity Unspecified (R)
69X - Local Subject Access Fields (R)

DEFINITION AND SCOPE

6XX fields contain subject access entries and terms. Most of these fields contain subject added entries or access terms based on the lists and authority files identified in the second indicator (Subject heading system/thesaurus) or in subfield \$2 (Source of subject heading or term). One field contains uncontrolled subject access data.

For **mixed materials** and collections under archival control, considerable use is made of the 6XX fields to reflect the subject content of the described materials through controlled and uncontrolled headings and terms. The 7XX fields are used less frequently to provide access.

Descriptions of the first indicator and all subfield codes, as well as input conventions for the 600, 610, 611, and 630 fields, are given in the following *General Information* sections: *X00*, *X10*, *X11* and *X30*. The second indicator is described in the specific section for each field. All content designators for the 647-688 fields are described in the specific section for each field.

CONTENT DESIGNATOR HISTORY

Field 600-651 - Subject added entries

Indicator 2 - Subject heading system/thesaurus

In 1982 the use of the second indicator value in subject added entry fields 600-651 was expanded from specifying the organization that **assigned** the subject added entry to specifying the subject heading system, thesaurus, or authority file **used** by an organization to assign the subject added entry. Accordingly, values 0-3 and 5-6 became authoritative-agency data elements and their definitions were changed to the names of the list or authority file. The definition of value 4 was changed from Other subject heading. Prior to 1975, value 5 was defined in the visual materials specifications as Subject heading to be printed only in LC book catalog. Prior to 1977, value 5 was defined in the archival and manuscripts control specifications as National Union Catalog of Manuscripts (NUCMC) subject heading.

Field 647 - Subject Added Entry-Named Event [NEW, 2016]

Field 648 - Subject Added Entry-Chronological Term [NEW, 2002]

Field 652 - Subject Added Entry-Reversed Geographic [OBSOLETE, 1980]

Field 652 was an agency-defined field used by the Library of Congress for reversed geographic added entries assigned to materials classed in LC classification number span G1000-G9999. For each regular *Topic-Place* subject heading assigned, a reversed *Place--Topic* heading was also assigned. Both indicator positions were undefined. The subfield codes were: \$a (Geographic name or place element), \$x (General subject subdivision), \$y (Chronological subject subdivision), \$z (Geographic subject subdivision).

Field 662 - Subject Added Entry - Hierarchical Place Name [NEW, 2005]

Field 680 - PRECIS Descriptor String [OBSOLETE, 1991] [CAN/MARC only]

PRECIS Descriptor String is a sequence of subject index terms in which each term is preceded by a code which determines how it should appear in entries generated by a computer. The first indicator was undefined. The second indicator values 0-9 were used to link alternative subject statements to the corresponding Dewey classification number. Subfields \$a-\$z contained the text of the PRECIS Descriptor String.

Field 681 - PRECIS Subject Indicator Number (SIN) [OBSOLETE, 1991] [CAN/MARC only]

PRECIS Subject Indicator Number (SIN) is a fixed-length number ending in a modulus 11 check digit. It identifies uniquely the address of the PRECIS data consisting of string and Reference Indicator Number (RIN). The first indicator was undefined. The second indicator values 0-9 were used to link the indicator to the corresponding PRECIS string and other associated subject data. Only subfield \$a (PRECIS subject indicator number (SIN)) was defined.

Field 683 - PRECIS Reference Indicator Number (RIN) [OBSOLETE, 1991] [CAN/MARC only]

PRECIS Reference Indicator Number (RIN) is a fixed-length number ending in a modulus 11 check digit which identifies the address of a term in the machine-held thesaurus used as the source of 'See' and 'See also' references in a printed index. The first indicator was undefined. The second indicator values 0-9 were used to link the index numbers to the corresponding PRECIS descriptor string. Only subfield \$a (Reference indicator number (RIN)) was defined.

Field 688 - Subject Added Entry - Type of Entity Unspecified [NEW, 2019]

APPENDIX F

050 - Library of Congress Call Number (R)

MARC 21 Bibliographic - Full

December 2017

First Indicator

Existence in LC collection

- No information provided

0 - Item is in LC

1 - Item is not in LC

Second Indicator

Source of call number

0 - Assigned by LC

4 - Assigned by agency other than LC

Subfield Codes

\$a - Classification number (R)

\$b - Item number (NR)

\$0 - Authority record control number or standard number (R)

\$1 - Real World Object URI (R)

\$3 - Materials specified (NR)

\$6 - Linkage (NR)

\$8 - Field link and sequence number (R)

FIELD DEFINITION AND SCOPE

Classification or call number that is taken from *Library of Congress Classification* or *LC Classification Additions and Changes*. The brackets that customarily surround alternate class/call numbers are not carried in the MARC record; they may be generated based on the presence of repeated \$a subfields.

Second indicator values distinguish between content actually assigned by the Library of Congress and content assigned by an organization other than LC.

Note that only subfield \$u is locally defined. The entire field description is repeated here for ease of use of this document.

GUIDELINES FOR APPLYING CONTENT DESIGNATORS

■ INDICATORS

First Indicator - Existence in LC collection

Whether or not the item is contained in the LC collections.

- No information provided

Used for all call numbers assigned by agencies other than the Library of Congress.

050 #4\$aNB933.F44\$bT6

0 - Item is in LC

Item is in the LC collections under the call number given in the field.

Other agencies should use this value when transcribing from LC cataloging copy on which the call number is neither enclosed within brackets nor preceded by a Maltese cross.

050 00\$aZ695.7\$b.B37 1980

1 - Item is not in LC

Item is not in the LC collections, or that it is not shelved under that number.

Used by other agencies when transcribing from LC copy on which the call number appears in brackets or is preceded by a Maltese cross. Brackets that customarily surround call numbers for items not in LC are not carried in the MARC record; they may be generated for display.

050 10\$aBJ1533.C4\$bL49

Second Indicator - Source of call number

Whether the source of the class/call number is the Library of Congress or another organization.

0 - Assigned by LC

Used when an institution is transcribing from LC cataloging copy.

050 00\$aJK609\$b.M2

4 - Assigned by agency other than LC**■ SUBFIELD CODES****\$a - Classification number**

Classification number portion of the call number. The source of the classification number is *Library of Congress Classification* and the *LC Classification-Additions and Changes*. Subfield \$a is repeated to record an alternative class number. The alternate class number is recorded following the last subfield of the call number. If the alternate class number also includes an item number, the item number is included in the same subfield \$a as the alternate class number; it is not separately subfielded.

050 00\$aQC861.2\$b.B36

050 00\$aZ695.7\$b.B37 1980

050 00\$aZ7164.N3\$bL34 no. 9\$aZ7165.R42\$aHC517.R42

050 00\$aRC951

\$b - Item number

Item number portion of the call number. An item number is the Cutter, date, term, etc. that is added to a classification number to distinguish an item from any other item assigned the same classification number.

Organizations that use the *Cutter-Sanborn Three-Figure Author Table* may conform to Library of Congress item number practice by applying *Subject Cataloging Manual: Shelflisting* conventions.

050 00\$aJX1974.7\$b.M5

050 00\$aZ673.L7\$bY

050 10\$aHF5726\$b.B27 1980

050 00\$aE506.5 6th\$bG

050 00\$aE514.6 10th\$b.T76 1905

[The above two call numbers are call numbers for regimental histories.]

\$0 - Authority record control number or standard number

See description of this subfield in Appendix A: [Control Subfields](#).

\$1 - Real World Object URI

See description of this subfield in Appendix A: [Control Subfields](#).

\$3 - Materials specified

Part of the described material to which the field applies. The subfield is used with archival-type materials; its use is parallel with the use of subfield \$3 in other fields.

\$6 - Linkage

See description of this subfield in Appendix A: [Control Subfields](#).

\$8 - Field link and sequence number

See description of this subfield in Appendix A: [Control Subfields](#).

INPUT CONVENTIONS

LCCNs - When the call number field consists only of a class number (letters followed by numbers, possibly including a period and also a space), no subfield \$b is used.

050 00\$aQA37

050 00\$aE525.5 123d

General rule is that the item number part of the call number begins at the last capital letter in the call number or the period, if present, preceding it.

050 00\$aHF5549.5.R44\$bM35

Exceptions to the general rule for item numbers:

If the call number is followed by only a date, with no Cutter number, the date is contained in subfield \$b.

050 00\$aE457.92\$b1967

If the call number is followed by volume numbering that includes uppercase letters, these letters are ignored in locating the last capital letter.

050 00\$aJX1977\$b.A2 St/ESA/35

050 00\$aHA1501\$bA, Nr. 615

050 00\$aHD28\$b.Y555 vol. 55 Suppl.

If the call number begins with CS71, subfield \$b contains the date.

050 00\$aCS71.C323\$b1977

If the call number is for a classification schedule (i.e., it is a call number beginning with Z696.U5), the class letter(s) for the particular classification and any following digit(s) are recorded in subfield \$a (as part of the classification). Subfield \$b contains the date.

050 00\$aZ696.U5E3\$b1958

050 00\$aZ696.U5H-HJ\$b1981

Abbreviations *subser.* and *Suppl.* are recorded in subfield \$b, even when there is no item number.

Capitalization - Alphabetic characters in the classification number portion of the field are generally uppercase.

Spacing - Any spaces that are desired as part of the call number must be input.

050 00\$aDK274.3 1968\$b.K39

050 00\$aVM341\$b.M9 vol. 48

050 00\$aCS71.C323\$b1977

Display Constant

[...] *[brackets]*

Brackets that customarily surround call numbers for items not in LC or alternate class/call numbers are not carried in the MARC record. They may be system generated as a display constant associated with the first indicator value 1 or additional \$a subfields.

Content designated field:

050 10\$aHF5726\$b.B27 1980

Display example:

[HF5726.B27 1980]

CONTENT DESIGNATOR HISTORY

Indicator 1 - Existence in LC collection

- *No information provided*

Prior to the definition of code 4 in the second indicator position in 1982, the first indicator in the visual materials specifications was undefined. Visual materials records created prior to 1982 may contain a # meaning *undefined* in the first indicator position.

Indicator 2 - Series call number (SE) [OBSOLETE]

In the serials specifications, the use of the second indicator position to indicate the type of series was made obsolete in 1976. The values were: 0 (No series involved), 1 (Main series), 2 (Subseries), 3 (Sub-subseries).

Indicator 2 - Source of call number

- *No information provided [OBSOLETE]*

Second indicator was defined in 1982. Prior to that change, 050 was an agency-assigned field and contained only call numbers assigned by the Library of Congress. LC records created before the definition of this indicator may contain a blank (#) meaning *undefined* in this position.

\$d - Supplementary class number (MU) [OBSOLETE, 1981]

\$0 - Authority record control number or standard number [NEW, 2017]

\$1 - Real World Object URI [NEW, 2017]

APPENDIX G

(<https://help.oclc.org>).

9xx Fields

9xx Introduction

9xx fields

9xx fields are not part of the standard MARC 21 format. OCLC has defined these 9xx fields for use by the Library of Congress and for internal OCLC use: 936, 938, 956, 987, 989, and 994. Fields 907, 910, and 945-949 have been defined by OCLC for your local use and will pass OCLC validation. The remaining 9xx fields may also be locally defined by your library, but may not pass OCLC validation.

OCLC services

OCLC services use some 9xx fields for processing. OCLC does not retain these fields in the WorldCat record. For example, field 951 is used for agent specific data for cataloging agent authorizations. This manual does not include descriptions of these fields.

The WorldCat Cataloging Partners, and other services, also use some 9xx fields to supply nonbibliographic information. Because WorldCat Cataloging Partners 9xx fields are defined by agreement between a library and a vendor, this manual does not include descriptions of these fields. OCLC removes WorldCat Cataloging Partners-defined 9xx fields from WorldCat records. You may still see 9xx fields that are not defined in WorldCat records. These fields will need to be removed before replacing the WorldCat record.

MARC 21

9xx fields are OCLC-defined and therefore not included in *MARC 21 Format for Bibliographic Data*.

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