

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZOHO CORPORATION and
ZOHO CORPORATION PVT., LTD.
Petitioner,

v.

MEETRIX IP, LLC,
Patent Owner.

U.S. Patent Nos. 8,339,997, 9,253,332, 9,094,525, and 9,843,612

DECLARATION OF INGRID HSIEH-YEE, PH.D., UNDER 37 C.F.R. § 1.68
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NOS. 8,339,997, 9,253,332, 9,094,525, AND 9,843,612

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I. INTRODUCTION

1. I, Ingrid Hsieh-Yee, Ph.D., have been retained as an independent expert witness on behalf of Zoho Corporation, for *Inter Partes Review* (IPR) proceedings before the United States Patent and Trademark Office challenging U.S. Patent Nos. 8,339,997, 9,253,332, 9,094,525, and 9,843,612 (the “patents-in-suit”).

2. I have no financial or other commercial interest on the outcome of this IPR. Aside from this consulting engagement, I have no relationship with Zoho. I am being compensated for my work in this matter at my customary hourly rate. I am also being reimbursed for any reasonable and customary expenses associated with my work and testimony in this matter. My compensation is not contingent on the results of my study, the substance of my opinions, or the outcome of this matter.

II. QUALIFICATIONS

3. My qualifications and profession experience are described in my academic *curriculum vitae*, which is submitted as **Appendix U**. The following is a brief summary of my relevant qualifications and experience.

4. I was a professor in the Department of Library and Information Science at the Catholic University of America for 32 years and retired at the end of August 2022. I have experience working in an academic library, a medical library, and a legislative

library. I hold a Ph.D. in Library and Information Studies from the University of Wisconsin-Madison and a Masters in Library and Information Studies from the University of Wisconsin-Madison.

5. I am an expert on library cataloging and classification. I have published two books on this subject. I taught a variety of courses, including Cataloging and Classification, Advanced Cataloging and Classification, Organization of Internet Resources, Organization of Information, Digital Content Creation and Management, Metadata, Internet Searches and Web Design, Information Literacy Instruction, Advanced Information Retrieval and Analysis Strategies, and The Information Professions in Society. I am familiar with metadata schema design and implementation. In my teaching I covered the use of metadata in libraries, databases, search engines, digital repositories, digital libraries, and digital archives. My research interests cover cataloging and classification, information organization, metadata, information retrieval, information architecture, digital collections, scholarly communication, social media, and user interaction with information systems, among others.

III. BACKGROUND OF LIBRARY CATALOGING

A. Machine-Readable Cataloging (“MARC”)

6. I am fully familiar with a library cataloging encoding standard known as the “Machine-Readable Cataloging” standard, also known as “MARC,” which became

the national standard for sharing bibliographic data in the United States by 1971 and the international standard by 1973. MARC is the primary communications protocol for the transfer and storage of bibliographic metadata in libraries. Experts in my field reasonably rely on MARC records when forming their opinions.

7. A MARC record consists of several fields, each containing data about a work. Each field is identified by a standardized, unique, three-digit code corresponding to the type of data that follows. **Appendix A** is a true and correct copy of Parts VII to X of *Understanding MARC Bibliographic: Machine-Readable Cataloging* (<https://www.loc.gov/marc/umb/um07to10.html>) from the Library of Congress that explains commonly used MARC fields. For example, the personal author of the work is recorded in Field 100, the title is recorded in Field 245, publisher information is recorded in Field 260, topical subjects are recorded in the 650 fields, and the physical volume and characteristics of a publication are recorded in Field 300. *Understanding MARC Bibliographic* was originally published by the Follett Software Co. and copyrighted in 1988. Editions in 1989, 1990, 1994, 1998, 2000, 2003 and 2009 include changes. The latest edition was copyrighted in 2009.

8. Online Computer Library Center (OCLC) is the largest bibliographic network in the world, with more than 540 million records (as of December 2021) and thousands of member institutions (many of which are libraries of some type) from more than 100 countries. OCLC was created in 1967 to promote and support library

cooperation. According to the “Third Article, Amended Articles of Incorporation of OCLC Online Computer Library Center, Inc.,” 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” (source: <https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf>).

9. OCLC members can contribute original cataloging records in MARC to the system or derive cataloging records from existing records, an activity referred to as “copy cataloging.” When an OCLC participating institution acquires a work, it can create an original MARC record for this work in OCLC’s Connexion system (a system for catalogers to create and share MARC records), and the system will automatically generate a code for the date of record creation in the yymmdd format, and the creating library’s OCLC symbol is recorded in subfield “a” of the 040 field. Once the MARC record is in Connexion, it becomes available to other OCLC members for adoption to their local online catalogs (*i.e.*, copy cataloging).

10. After a MARC record is created in Connexion, it also becomes searchable and viewable on WorldCat, which is a free web portal for members of the public to explore the collections of more than 10,000 libraries worldwide. Records in WorldCat, however, are not presented in MARC fields. Instead, data elements are labeled to help the general public interpret the record.

B. Library Online Catalogs

11. Library online catalogs gained acceptance in early 1980s and many libraries migrated their systems to the World Wide Web in the mid-1990s. Library online catalogs are based on MARC records that represent their collections in order to help the public understand what materials are publicly accessible in those libraries. Most libraries with online catalogs have made their catalogs freely available on the Web. These online catalogs offer user-friendly search interfaces to support searching by author, title, subject, keywords, and other data elements. They also offer features for users to narrow search results by language, year, format, and other elements. Many libraries display MARC records on their online catalogs with labels for the data elements to help the public interpret MARC records. Many libraries also offer an option to display MARC records in MARC fields.

12. I am personally familiar with many online catalogs, databases, and search engines. In preparing this declaration, I used the following authoritative information systems to search for records:

- Google Scholar (<https://scholar.google.com>)
- ITU-T Recommendation database (<https://www.itu.int/ITU-T/recommendations/index.aspx>)
- Online catalog at the Library of Congress (<https://catalog.loc.gov>)
- Online catalog of the Massachusetts Institute of Technology Libraries (MIT Libraries) (https://mit.primo.exlibrisgroup.com/discovery/search?vid=01MIT_I NST:MIT&lang=en)
- Online catalog of the Public catalog of the United States Copyright Office (<https://cocatalog.loc.gov>)
- RFC Editor system (<https://www.rfc-editor.org>)
- WorldCat (<https://www.worldcat.org>)

C. Cataloging New Works

13. Libraries create MARC records for works they acquire, including books, serials, motion pictures, and publications in other formats. Monograph cataloging is fairly common in libraries, and most libraries make a newly cataloged monograph available to the public soon after the cataloging work is completed, usually within a week.

14. The cataloging of serials and the serial check-in process are discussed here to show how libraries usually provide access to newly received serial issues. According

to the glossary of the *RDA: Resource Description and Access* cataloging standard, a serial is “a mode of issuance of a manifestation issued in successive parts, usually bearing numbering, that has no predetermined conclusion. A serial includes a periodical, monographic series, newspaper, etc.” Because the publisher of a serial makes new issues of the serial available successively, a customary cataloging practice is to create one bibliographic record for the serial, the MARC serial record typically providing information on the beginning date and frequency of the serial, rather than the dates of individual issues. In other words, libraries typically do not create MARC records for individual issues of a serial. Instead, they rely on a serial check-in system to track the receipt of new issues. A common check-in practice is to date stamp a new issue when it arrives. This practice has become automated since the late 1990s, and libraries now vary in how they share the receipt date of a new serial issue with the public. Some libraries use a date stamp, some affix a label to indicate the receipt date, some pencil in the receipt date, and some do not provide the information to the public.

15. The serial check-in process usually takes less than an hour, one of the steps involving placing a date stamp on the new issue to document the date the issue is checked in. After that, the holdings information of the serial is updated in the library’s catalog so that users know which issues are available for request or access. After serial check-in is completed, the new issue typically is placed on the shelf with

the previous issues of the serial. Libraries with a public periodical room typically place new issues in the periodical room for easy user access. It is a general practice of libraries is to make new issues of serials available for user access soon after they are checked in, usually within a week, as information presented in serials often reflects the latest or recent discoveries.

IV. SCOPE OF THE DECLARATION

16. I have been asked to offer an opinion on the authenticity and public availability date of the following documents:

- a. Postel, J., “DOD Standard Internet Protocol,” RFC 760, DOI 10.17487/RFC0760, January 1980, available at the RFC Editor at <https://www.rfc-editor.org/rfc/pdf/rfc760.txt.pdf>, **Ex.1028** (“*RFC 760*”);
- b. Postel, J., “Internet Protocol—DARPA Internet Program Protocol Specification,” RFC 791, DOI 10.17487/RFC0791, September 1981, available at the RFC Editor at <https://www.rfc-editor.org/rfc/pdf/rfc791.txt.pdf>, **Ex.1029** (“*RFC 791*”);
- c. Deering, S., “Host Extensions for IP Multicasting,” RFC 1112, DOI 10.17487/RFC1112, August 1989, available at the RFC Editor at <https://www.rfc-editor.org/rfc/pdf/rfc1112.txt.pdf>, **Ex.1030** (“*RFC 1112*”);

- d. Kent, S. & Atkinson, R., “Security Architecture for the Internet Protocol,” RFC 2401, DOI 10.17487/RFC2401, November 1998, available at the RFC Editor at <https://www.rfc-editor.org/rfc/pdf/rfc2401.txt.pdf>, **Ex.1031** (“*RFC 2401*”);
- e. Kent, S. & Atkinson, R., “IP Encapsulating Security Payload (ESP),” RFC 2406, DOI 10.17487/RFC2406, November 1998, available at the RFC Editor at <https://www.rfc-editor.org/rfc/pdf/rfc2406.txt.pdf>, **Ex.1032** (“*RFC 2406*”);
- f. DataBeam Corporation, “A Primer on the T.120 Series Standard,” a DataBeam Corporation white paper, updated May 14, 1997, available at https://www.packetizer.com/ipmc/t120/primer/t120_primer.pdf, **Ex.1016** (“*T.120 Primer*”);
- g. ITU-T Recommendation T.120, Data protocols for multimedia conferencing, July 1996, available at the ITU-T Recommendation database at <http://handle.itu.int/11.1002/1000/3383-en?locatt+format:pdf&auth>, **Ex.1017** (“*T.120 Standard*”);
- h. Caputo, R., *Cisco Packetized Voice & Data Integration*, McGraw-Hill, 2000, selected pages obtained from the Library of Congress, **Ex.1021** (“*Caputo*”);

- i. De Moraes, L. F., & Weinstein, S. B., The Internet multicast from ITS: How it was done and implications for the future, *IEEE Communications Magazine*, 33(1), January 1995, pp. 6-8, obtained from the Massachusetts Institute of Technology Libraries, **Ex.1022** (“*De Moraes*”);
- j. Freedman, A., *Computer Desktop Encyclopedia*, 9th Ed., Osborne/McGraw-Hill, 2001, selected pages obtained from the Library of Congress, **Ex.1027** (“*Freedman*”);
- k. Guichard, J., & Pepelnjak, I., *MPLS and VPN Architectures* (Vol. 1), Cisco Press, 2001, selected pages obtained from the Library of Congress, **Ex.1010** (“*VPN Textbook*”).

I am rendering my expert opinion on the authenticity of the documents referenced herein and on whether they were published. I also provide my opinion on when and how these documents were publicly disseminated or otherwise made publicly available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located and retrieved these documents.

17. I have been 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 have also been informed that authenticity can be established based on the contents

of the documents themselves, such as the appearance, content, substance, internal patterns, protocols followed, or other distinctive characteristics of the item.

18. I have been further informed by counsel that a given document is deemed “published” upon a satisfactory showing that such a document has been disseminated or otherwise made publicly available such that persons interested and ordinarily skilled in the subject matter or art could locate and obtain the document after exercising reasonable diligence. I have also been informed by counsel that materials available in a library constitute “printed publications” if they are cataloged and indexed according to general library practices and protocols that make the references available and accessible to members of the interested public.

19. I have been informed by counsel that U.S. Patent Nos. 8,339,997, 9,253,332, 9,094,525, and 9,843,612 claim priority to a provisional patent application filed on March 10, 2003. I have assessed public availability of the documents referenced below as of the earliest claimed priority date of March 10, 2003.

A. Person of Ordinary Skill in the Art

20. I have been informed by counsel that a “person of ordinary skill in the art” (POSITA) is a hypothetical person who is presumed to be familiar with the relevant field and its literature as of the claimed priority date. The hypothetical person is also a person of ordinary creativity, capable of understanding the scientific principles and literature applicable to the pertinent field.

21. I have been informed by counsel that a POSITA at and around the time of the earliest claimed priority date of March 10, 2003, would include someone who had a working knowledge of available audio and video conferencing technologies. A POSITA would also have had a bachelor's degree in electrical engineering, computer science, computer engineering, or an equivalent, and three years of professional experience relating to conferencing systems in packet-based networks.

22. It is my opinion that such a person would have been actively engaged in learning about the field, possibly through formal instruction through the bibliographic resources. By at the latest March 10, 2003, such a person would have had access to a vast array of print and electronic resources, including at least the documents referenced below.

B. Evidence Considered in Forming My Opinions

23. In preparing this declaration, I have considered my own academic background and professional experiences, as described above, and have reviewed the documents referenced below and any other documents I reference herein. Each of these is a type of materials that experts in my field would reasonably rely upon when forming their opinion:

- a. RFC Editor Record for *RFC 760*, available at the RFC Editor at <https://www.rfc-editor.org/info/rfc760>, **Appendix B**;

- b. RFC Editor Record for *RFC 791*, available at the RFC Editor at <https://www.rfc-editor.org/info/rfc791>, **Appendix C**;
- c. RFC Editor Record for *RFC 1112*, available at the RFC Editor at <https://www.rfc-editor.org/info/rfc1112>, **Appendix D**;
- d. RFC Editor Record for *RFC 2401*, available at the RFC Editor at <https://www.rfc-editor.org/info/rfc2401>, **Appendix E**;
- e. RFC Editor Record for *RFC 2406*, available at the RFC Editor at <https://www.rfc-editor.org/info/rfc2406>, **Appendix F**;
- f. HTML version of the *T.120 Primer*, 1997, available at <https://www.packetizer.com/ipmc/t120/primer/>, **Appendix G**;
- g. ITU-T Record for the *T.120 Standard*, available at the ITU-T recommendations database at <https://www.itu.int/itu-t/recommendations/rec.aspx?rec=3383&lang=en>, **Appendix H**;
- h. MARC record for *Cisco Packetized Voice & Data Integration*, 2000, available at the Library of Congress online catalog at <https://catalog.loc.gov/vwebv/staffView?searchId=22719&recPointer=0&recCount=25&searchType=0&bibId=11768875>, **Appendix I**;
- i. Bibliographic record for *Cisco Packetized Voice & Data Integration*, 2000, available at the Library of Congress online catalog at <https://lcn.loc.gov/99040271>, **Appendix J**;

- j. Copyright registration record for *Cisco Packetized Voice & Data Integration*, 2000, available at the copyright catalog of the United States Copyright Office at https://cocatalog.loc.gov/cgi-bin/Pwebrecon.cgi?v1=2&ti=1,2&SEQ=2-191228172149&Search%5FArg=Cisco%20Packetized%20Voice%20and%20Data%20Integration&Search%5FCode=TALL&CNT=25&PID=up2MYFzwp6_cjWeSphId944G1Z8G&SID=1, **Appendix K**;
- k. Bibliographic record for *IEEE Communications Magazine*, whose vol. 33, no. 1, contains De Moraes, available from the online catalog of the Massachusetts Institute of Technology Libraries at <http://library.mit.edu/item/000282028>, **Appendix L**;
- l. MARC record for *IEEE Communications Magazine*, whose vol. 33, no. 1, contains De Moraes, available from the online catalog of the Massachusetts Institute of Technology Libraries at <http://library.mit.edu/item/000282028> (select MARC tags), **Appendix M**;
- m. Holdings record for *IEEE Communications Magazine*, whose vol. 33, no. 1, contains De Moraes, available from the online catalog of the Massachusetts Institute of Technology Libraries at <http://library.mit.edu/item/000282028> (select Library Storage Annex link), **Appendix N**;

- n. MARC record for *Freedman*, Osborne/McGraw-Hill, 2001, available at the Library of Congress online catalog at <https://catalog.loc.gov/vwebv/staffView?searchId=14333&recPointer=10&recCount=25&bibId=12555053>, **Appendix O**;
- o. Bibliographic record for *Freedman*, Osborne/McGraw-Hill, 2001, available at the Library of Congress online catalog at <https://lcn.loc.gov/2001278111>, **Appendix P**;
- p. Copyright registration record for *Freedman*, Osborne/McGraw-Hill, 2001, available at the copyright catalog of the United States Copyright Office at <https://cocatalog.loc.gov/cgi-bin/Pwebrecon.cgi?v1=7&ti=1,7&Search%5FArg=Computer%20desktop%20encyclopedia&Search%5FCode=TALL&CNT=25&PID=5p0749PtEN4a8I5cYP6zKm66LCFo&SEQ=20181228175717&SID=3>, **Appendix Q**;
- q. MARC record for *MPLS and VPN Architectures* (Vol. 1), Cisco Press, 2001, available at the Library of Congress online catalog at <https://catalog.loc.gov/vwebv/staffView?searchId=22430&recPointer=0&recCount=25&searchType=1&bibId=12027814>, **Appendix R**;
- r. Bibliographic record for *MPLS and VPN Architectures* (Vol. 1), Cisco Press, 2001, available at the Library of Congress online catalog at <https://lcn.loc.gov/00105168>, **Appendix S**;

s. Copyright registration record for *MPLS and VPN Architectures* (Vol. 1), Cisco Press, 2001, available at the copyright catalog of the United States copyright Office at <https://cocatalog.loc.gov/cgi-bin/Pwebrecon.cgi?v1=11&ti=1,11&Search%5FArg=Guichard%2C%20J&Search%5FCode=NALL&CNT=25&PID=ak7LQCNUVzecGBxeb8G9h69kK6mX&SEQ=20220509192325&SID=5>, **Appendix T.**

V. ANALYSIS

A. RFC 760 (Ex.1028)

24. In preparing this declaration, I searched the RFC Editor system for records because this system provides access to the RFC (Request for Comments) Series that “contains technical and organizational documents about the Internet” (<https://www.rfc-editor.org>). The RFC History webpage indicates that the RFC “series was originated in 1969 by Steve Crocker of UCLA, to organize the working notes of the new ARPAnet research program. Online data access (e.g., FTP) was defined in early RFCs, and the RFC series itself became the first online publication series. ... The RFC Editor operation was funded by the Defense Advanced Research Projects Agency (DARPA) of the US government until 1998. From 1998, the RFC Editor was funded by a contract with the Internet Society, to continue to edit, publish, and catalog RFCs. The RFC Editor was a project at the USC Information Sciences Institute in Marina del Rey, California, through 2009. Currently, the RFC Production

Center and Publisher functions are provided by Association Management Solutions, LLC (AMS)” (<https://www.rfc-editor.org/history/>). Experts in my field would reasonably rely upon RFC Editor records in forming their opinions.

25. **Ex.1028** is a true and correct copy of the PDF version of *RFC 760* that is available at <https://www.rfc-editor.org/rfc/pdf/rfc/rfc760.txt.pdf>. I obtained this document on May 2, 2022, by following a link in the RFC Editor record for *RFC 760* (**Appendix B**). The cover of **Ex.1028** shows “DOD STANDARD INTERNET PROTOCOL” as the title, followed by “January 1980” and a statement indicating it was “prepared for Defense Advanced Research Projects Agency” by the “Information Sciences Institute, University of Southern California.” The Preface (internal page iii) of **Ex.1028** identifies “Jon Postel” as the editor, stating further that the “document specifies the DoD Standard Internet Protocol” and “is based on five earlier editions of the ARPA Internet Protocol Specification.”

26. This copy of *RFC 760* (**Ex.1028**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1028** was found in the custody of the RFC Editor System, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this copy of *RFC 760* (**Ex.1028**).

27. **Appendix B** is a true and correct copy of the RFC Editor record for *RFC 760* that I retrieved on May 2, 2022, from the RFC Editor system, using it to obtain **Ex.1028**. The record shows that the DOI (digital object identifier) of *RFC 760* is “10.17487/RFC0760.” It identifies the title of *RFC 760* as “DoD Standard Internet Protocol,” the publication date as “January 1980,” and the author as “J. Postel.” The record provides links to the plain text version, the PDF version, and the HTML version of *RFC 760*, and tracks the history of *RFC 760*, indicating it was obsoleted by RFC 791 and updated by RFC 777.

1. Actual Usage

28. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least four documents published from 1980 to 1983 that cite *RFC 760* (January 1980), and the earliest citing document was published in “October 1980”:

- a. Cerf, V. G. (October 1980), “Comments on NCP/TCP mail service transition strategy” (RFC 773);
- b. Su, Z. (May 1981), “Specification of the Internet Protocol (IP) timestamp option” (RFC 781);
- c. Chou, W. ed. (1983), *Computer Communications*. Vol. 1 *Principles*, Prentice Hall, ISBN: 0131650432; and

d. Cahn, D. U., & Yen, A. C. (1983, July), A device-independent network graphics system, *ACM SIGGRAPH Computer Graphics*, vol. 17, no. 3, pp. 167-173, ACM.

B. RFC 791 (Ex.1029)

29. **Ex.1029** is a true and correct copy of the PDF version of *RFC 791* that is available at <https://www.rfc-editor.org/rfc/pdf/rfc791.txt.pdf>. I obtained this document on May 2, 2022, by following a link in the RFC Editor record for *RFC 791* (**Appendix C**). The cover of **Ex.1029** shows “INTERNET PROTOCOL DARPA INTERNET PROGRAM PROTOCOL SPECIFICATION” as the title, followed by “September 1981” and a statement indicating it was “prepared for Defense Advanced Research Projects Agency” by the “Information Sciences Institute, University of Southern California.” The Preface (internal page iii) of **Ex.1029** identifies “Jon Postel” as the editor, stating further that the “document specifies the DoD Standard Internet Protocol” and “is based on six earlier editions of the ARPA Internet Protocol Specification.”

30. This copy of *RFC 791* (**Ex.1029**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1029** was found in the custody of the RFC Editor System, a place where, if authentic, it

would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *RFC 791* (**Ex.1029**).

31. **Appendix C** is a true and correct copy of the RFC Editor record for *RFC 791* that I retrieved on May 2, 2022, from the RFC Editor system, using it to obtain **Ex.1029**. The record shows that the DOI (digital object identifier) of *RFC 791* is “10.17487/RFC0791.” It identifies the title of *RFC 791* as “Internet Protocol,” the publication date as “September 1981,” and the author as “J. Postel.” The record provides links to the plain text version, the PDF version, the HTML version and the HTML version with inline errata of *RFC 791*, and tracks the history of *RFC 791*, indicating it was updated by RFC 1349, RFC 2474, and RFC 6864.

1. Actual Usage

32. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least five documents published in 1982 that cite *RFC 791* (September 1981), and the earliest citing document was published in March 1982:

- a. Fienler, E. J. Harrenstien, K., Su, Z., & White, V. (March 1982), *DoD* “Internet host table specification” (RFC 810);
- b. MacGregor, W. I., & Tappan, D. C. (August 1982), “The Cronus Virtual Local Network” (RFC 824);

- c. Hinden, R. M., & Sheltzer, A. (September 1982), “DARPA Internet gateway” (RFC 823);
- d. Lloyd, P., & Cole, R. (September 1982). Transport Protocol Performance over Concatenated Local Area and Satellite Networks. In *Proceedings of the Working Conference of the joint GI/NTG working group "Computer Network" on Data Networks with Satellites* (pp. 89-113); and
- e. Organick, E. I., Lindstrom, G., Smith, D. K., Subrahmanyam, P. A., & Carter, T. (November 1982), “Transformation of ADA Programs into Silicon” (no. UTEC-82-103), Utah Univ. Salt Lake City School of Computing.

C. RFC 1112 (Ex.1030)

33. **Ex.1030** is a true and correct copy of the PDF version of *RFC 1112* that is available at <https://www.rfc-editor.org/rfc/pdf/rfc1112.txt.pdf>. I obtained this document on May 2, 2022, by following a link in the RFC Editor record for *RFC 1112* (**Appendix D**). The first page of **Ex.1030** shows “Host Extensions for IP Multicasting” as the title, “S. Deering” of Stanford University as the author, and “August 1989” as the date of publication. *RFC 1112* renders “RFCs 988, 1054” obsolete.

34. This copy of *RFC 1112* (**Ex.1030**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1030**

was found in the custody of the RFC Editor System, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *RFC 1112* (**Ex.1030**).

35. **Appendix D** is a true and correct copy of the RFC Editor record for *RFC 1112* that I retrieved from the RFC Editor system on May 2, 2022. I used a link in **Appendix D** to obtain **Ex.1030**. The record shows that the DOI of *RFC 1112* is “10.17487/RFC1112.” It identifies the title of *RFC 1112* as “Host extensions for IP multicasting,” the publication date as “August 1989,” and the author as “S.E. Deering.” The record provides links to the plain text version, the PDF version, and the HTML version of RFC 1112, and tracks the history of *RFC 1112*, indicating it “Obsoletes: RFC 988, RFC 1054” and was “Updated by: RFC 2236.”

1. Actual Usage

36. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least three documents published in 1989 that cite *RFC 1112* (August 1989), the earliest citing document was published in September 1989:

- a. Krol, E. (September 1989), “Hitchhikers guide to the Internet” (RFC 1118);
- b. Braden, R. (October 1989), “Requirements for Internet Hosts - Communication Layers” (RFC 1122);

c. Danzig, P. B. (December 1989), “Optimally Selecting the Parameters of Adaptive Backoff Algorithms for Computer Networks and Multiprocessors” (No. UCB/CSD-89-542), EECS Department, University of California, Berkeley.

D. RFC 2401 (Ex.1031)

37. **Ex.1031** is a true and correct copy of the PDF version of *RFC 2401* that is available at <https://www.rfc-editor.org/rfc/pdf/rfc2401.txt.pdf>. I obtained this document on May 2, 2022, by following a link in the RFC Editor record for *RFC 2401* (**Appendix E**). The first page of **Ex.1031** shows “Security Architecture for the Internet Protocol” as the title, “S. Kent” and “R. Atkinson” as authors, and “November 1998” as the date of publication. *RFC 2401* renders RFC 1825 obsolete. The “Status of this Memo” indicates the “document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. ... Distribution of this memo is unlimited.”

38. This copy of *RFC 2401* (**Ex.1031**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1031** was found in the custody of the RFC Editor System, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *RFC 2401* (**Ex.1031**).

39. **Appendix E** is a true and correct copy of the RFC Editor record for *RFC 2401* that I retrieved from the RFC Editor system on May 2, 2022. I used a link in **Appendix E** to obtain **Ex.1031**. The record shows that the DOI of *RFC 2401* is “10.17487/RFC2401.” It identifies the title of *RFC 2401* as “Security Architecture for the Internet Protocol,” the publication date as “November 1998,” and the authors as “S. Kent” and “R. Atkinson.” The record provides links to the plain text version, the PDF version, and the HTML version of *RFC 2401*, and tracks the history of *RFC 2401*, indicating it “Obsoletes: RFC 1825” and is “Obsoleted by RFC 4301” and “Updated by: RFC 3168.”

1. Actual Usage

40. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least five documents published in 1998 that cite *RFC 2401* (November 1998), the earliest citing documents were published in November 1998:

- a. Madson, C., & Doraswamy, N. (November 1998), “The ESP DES-CBC Cipher Algorithm With Explicit IV” (RFC 2405);
- b. Madson, C., & Glenn, R. (November 1998), “The Use of HMAC-MD5-96 within ESP and AH” (RFC 2403);

- c. Maughan, D., Schertler, M., Schneider, M., & Turner, J. (November 1998), “Internet Security Association and Key Management Protocol (ISAKMP)” (RFC 2408);
- d. Thayer, R., Doraswamy, N., & Glenn, R. (November 1998), “IP Security Document Roadmap” (RFC 2411); and
- e. Conta, A., & Deering, S. (December 1998), “Generic Packet Tunneling in IPv6 Specification” (RFC 2473).

E. RFC 2406 (Ex.1032)

41. **Ex.1032** is a true and correct copy of the PDF version of *RFC 2406* that is available at <https://www.rfc-editor.org/rfc/pdf/rfc2406.txt.pdf>. I obtained this document on May 2, 2022, by following a link in the RFC Editor record for *RFC 2406* (**Appendix F**). The first page of **Ex.1032** shows “IP Encapsulating Security Payload (ESP)” as the title, “S. Kent” and “R. Atkinson” as the authors, and “November 1998” as the date of publication. *RFC 2406* renders RFC 1827 obsolete.

42. This copy of *RFC 2406* (**Ex.1032**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1032** was found in the custody of the RFC Editor System, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *RFC 2406* (**Ex.1032**).

43. **Appendix F** is a true and correct copy of the RFC Editor record for *RFC 2406* that I retrieved from the RFC Editor system on May 2, 2022. I used a link in **Appendix F** to obtain **Ex.1032**. The record shows that the DOI of *RFC 2406* is “10.17487/RFC2406.” It identifies the title of *RFC 2406* as “IP Encapsulating Security Payload (ESP),” the publication date as “November 1998,” and the authors as “S. Kent” and “R. Atkinson.” The record provides links to the plain text version, the PDF version, and the HTML version of *RFC 2406*, and tracks the history of *RFC 2406*, indicating it “Obsoletes: RFC 1827” and is “Obsoleted by: RFC 4303, RFC 4305.”

1. Actual Usage

44. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least five documents published in 1998 that cite *RFC 2406* (November 1998), the earliest citing documents were published in November 1998:

- a. Madson, C., & Glenn, R. (November 1998), “The Use of HMAC-MD5-96 within ESP and AH” (RFC 2403);
- b. Madson, C., & Doraswamy, N. (November 1998), “The ESP DES-CBC Cipher Algorithm With Explicit IV” (RFC 2405);
- c. Thayer, R., Doraswamy, N., & Glenn, R. (November 1998), “IP Security Document Roadmap” (RFC 2411);

- d. Orman, H. (November 1998), “The OAKLEY Key Determination Protocol” (RFC 2412); and
- e. Pereira, R., & Adams, R. (November 1998), “The ESP CBC-Mode Cipher Algorithms” (RFC 2451).

F. T.120 Primer (Ex.1016)

45. **Ex.1016** is a true and correct copy of the PDF version of “A Primer on the T.120 Series Standard” by DataBeam that is available at https://www.packetizer.com/voip/t120/primer/t120_primer.pdf. I obtained this document on May 2, 2022, by searching Google for the document title, “A Primer on the T.120 Series Standard.” The search results include an HTML version of this primer (**Appendix G**) at <https://www.packetizer.com/ipmc/t120/primer/>, which includes a link to the PDF version. The cover of **Ex.1016** shows “A Primer on the T.120 Series Standard” as the title, “DataBeam” as the author and publisher, and a “t.120” logo. The document has a running title, “A DataBeam Corporation White Paper” in the top header of each page, and page 18 of **Ex.1016** (the page following internal page 16) shows that **Ex.1016** has copyright dates of “1995, 1996, 1997” with DataBeam as the copyright holder and that the document was “updated May 14, 1997.” A note on this page indicates the “document may be reproduced, provided such reproduction is performed in its complete, unaltered form.”

46. This copy of *T.120 Primer* (**Ex.1016**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1016** was found in the custody of the Packetizer database, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this copy of *T.120 Primer* (**Ex.1016**).

47. **Appendix G** is a true and correct copy of the HTML version of “A Primer on the T.120 Series Standard” by DataBeam, available at the website <https://www.packetizer.com/ipmc/t120/primer/>. I accessed this site after searching for the title “A Primer on the T.120 Series Standard” in the Google search engine. **Appendix G** provides a link to the “PDF version” (**Ex.1016**). A note at the end of **Appendix G** states, “This document is copyright © 1997 by DataBeam Corporation and is reproduced with permission.”

1. Actual Usage

48. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least four documents published in 1998 and 1999 that cite “A Primer on the T.120 Series Standard” (May 1997) by DataBeam, and the earliest citing document was published in October 1998:

- a. Beijar, N. (October 1998), “Signaling Protocols for Internet Telephony – Architectures Based on H.323 and SIP,” Helsinki University of Technology Laboratory of Telecommunications Technology;
- b. Karim, A. (1999), “H.323 and Associated Protocols,” Helsinki University of Technology;
- c. Pancerella, C. M., Rahn, L., & Yang, C. (January 1999), The Diesel Combustion Collaboratory: Combustion researchers collaborating over the Internet, in *Proceedings of the 1999 ACM/IEEE conference on Supercomputing*, pp. 64-64); and
- d. Schmidt, B. K., Lam, M. S., & Northcutt, J. D. (December 1999), The interactive performance of SLIM: a stateless, thin-client architecture, *ACM SIGOPS Operating Systems Review*, vol. 33, no. 5, pp. 32-47.

G. T.120 Standard (Ex.1017)

49. **Ex.1017** is a true and correct copy of the PDF version of “Data protocols for multimedia conferencing—ITU-T Recommendation T.120.” I obtained this document on May 2, 2022, by searching the ITU-T Recommendation database for “T.120” and accessed the record for the July 1996 version at <https://www.itu.int/itu-t/recommendations/rec.aspx?rec=3383&lang=en>. I followed the link in the record to download the PDF version. The cover of **Ex.1017** shows “Data protocols for multimedia conferencing” as the title, and the bottom of the cover page indicates the

document is “ITU-T Recommendation T.120 (Previously CCITT Recommendation).” Above the title on the cover page a note indicates the document is in “Series T: Terminal Equipments and Protocols for Telematic Services” and ITU-T is the “Telecommunication Standardization Sector of ITU.” At the top of the cover page, an ITU logo is presented with the text “International Telecommunication Union” and a document number marking: “T.120 (07/96).” Page 3 of **Ex.1017** shows the title, subtitle, summary, and source of the document. The source note indicates “ITU-T Recommendation T.120 was prepared by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution N°1 procedure on the 3rd of July 1996.” There is a running footer on each page stating “Recommendation T.120 (07/96).”

50. This copy of *T.120 Standard* (**Ex.1017**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1017** was found in the custody of the International Telecommunication Union, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *T.120 Standard* (**Ex.1017**).

51. **Appendix H** is a true and correct copy of the record I retrieved from the ITU-T Recommendation database on May 2, 2022. **Appendix H** is identified with the record identifier “ITU-T T.120 (07/1996)” and shows the document title as “Data

protocols for multimedia conferencing.” The citation for this record is presented as <https://handle.itu.int/11.1002/1000/3383> and the “Approval date” indicated is “1996-07-03.” The Editions area shows the 1996 version is the first edition of this recommendation, followed by “T.120 Annex C (02/1998)” and “T.120 (01/2007).” Links to the 1996 version are provided in the Editions area, as well as a PDF link at the top right of the page.

1. Actual Usage

52. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least four documents published in 1997 that cite the T.120 Standard (July 1996):

- a. Ott, J. (April 1997), “A Multipoint Data Communication Infrastructure for Standards-based Teleconferencing Systems,” Doctoral dissertation, Berlin Institute of Technology
- b. Lee, K. C., Chang, K. N., Yu, S. S., Chang, C., Shia, C. W., Chen, W. C., & Huang, J. H. (August 1997), Design and implementation of important applications in a Java-based multimedia digital classroom, *IEEE Transactions on Consumer Electronics*, 43(3), 264-270;
- c. Delgado, J., & Acebrón, J. J. (1997), Using multimedia document communication services on top of T.120 protocols, *ELPUB Digital Library*, Vol. ELPUB1997; and

- d. Handley, M. (1997), “On Scalable Internet Multimedia Conferencing Systems,” Doctoral dissertation, University of London.

H. Caputo (Ex.1021)

53. **Ex.1021** is a true and correct copy of portions of *Cisco Packetized Voice and Data Integration* (“*Caputo*”) that I made on November 30, 2018, during a personal visit to the Library of Congress for a previous engagement relating to some of the patents-in-suit. Because books published in the United States tend to be registered with the Copyright Office of the Library of Congress and cataloged by the Library of Congress, I searched the online catalog of the Library to Congress by the title of *Caputo* to determine if the library held this book. The search results confirmed the holdings information, with the holdings record showing the book could be requested at the “Jefferson or Adams Building Reading Rooms,” and the status of the book was “Not Charged,” meaning it was available for user request. I then requested access to this title and received the physical volume on November 30, 2018, at the Library of Congress Science and Business Reading Room in the Adams Building. This scanned copy is presented as **Ex.1021** in this declaration.

54. While at the Library of Congress, I produced **Ex.1021** by personally scanning the front matter (the front cover, the series title page, the title page, the copyright page, and the table of contents) and select content pages from *Caputo*, including

pages 11-13 and 22-23, the last numbered page, the back cover of the book, the back of the bound volume, and the spine of the volume.

55. Page 1 of **Ex.1021** is the cover that shows “Cisco Packetized Voice & Data Integration” as the title and “Robert Caputo” as the author. The cover shows “McGraw-Hill Technical Expert” above the title, and the back cover (page 18) shows this work is “A volume in the McGraw-Hill Technical Expert series.” Page 2 is the series title page that shows “McGraw-Hill Technical Expert Series” as the series title and lists 15 titles of this series. Page 3 is the title page that shows the same title and author information as the cover. The title page carries a stamp stating “LIBRARY OF CONGRESS OCT 07 1999 COPYRIGHT OFFICE” and shows McGraw-Hill of New York as the publisher. Page 4 is the copyright page that shows a “2000” copyright date with The McGraw-Hill Companies, Inc. as the copyright holder. The copyright page and the back cover both show “0-07-134777-1” as the ISBN (International Standard Book Number) of this work. The copyright page further shows a handwritten call number of “TK5105.8865 .C37 2000 Copy 2” for this copy at the Library of Congress.

56. This copy of *Caputo* (**Ex.1021**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1021** was found in the custody of the Library of Congress, a place where, if authentic, it

would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *Caputo* (**Ex.1021**).

1. Library of Congress Records

57. **Appendix I** is a true and correct copy of the MARC record for *Caputo* and **Appendix J** is a true and correct copy of the Bibliographic record for *Caputo*. I retrieved these records from the online catalog of the Library of Congress (<https://catalog.loc.gov>) by searching for the book title “Cisco Packetized Voice and Data Integration”. I personally located, identified, and obtained these records. Each of these records is the type of records experts in my field would reasonably rely upon in forming their opinions.

58. Field 245 of the MARC record (**Appendix I**) and the title field of the Bibliographic record (**Appendix J**) show the book title as “Cisco packetized voice and data integration.” Field 100 of the MARC record and the personal name field of the Bibliographic record identify the author as “Caputo, Robert.” Field 260 of the MARC record and the published/created field of the Bibliographic record show that Caputo was published by McGraw-Hill in New York with a 2000 copyright date. Field 020 of the MARC record and the ISBN field of the Bibliographic record show “0071347771” as the ISBN assigned to *Caputo*. The title, author, publisher, publication date, and the ISBN in the MARC record and the Bibliographic record

match the information contained in **Ex.1021**, confirming these two records represent *Caputo*.

59. The first six digits of Field 008 of the MARC record (**Appendix I**) inform me that the MARC record was first created on “990802” (*i.e.*, August 2, 1999), and the “s2000” code following the record creation date indicates *Caputo* has a single publication date of 2000. Field 040 subfield “a” shows that “DLC” is the library that created the original MARC record. According to the *Directory of OCLC Members* (<https://www.oclc.org/en/contacts/libraries.html>), “DLC” is the OCLC symbol for the Library of Congress. Field 955 is a local note field that records the cataloging activity dates. It shows that the MARC record was first created on “08-02-99” (*i.e.*, August 2, 1999), “CIP vers. ... 05-03-00” (*i.e.*, verified by CIP on May 3, 2000), “to BCCD 05-10-00” (*i.e.*, sent to the Binding and Collections Care Division on May 10, 2000) and “copy2 added ... 07-26-00; to BCCD 07-26-00” (*i.e.*, copy 2 added to the library collection on July 26, 2000 and sent to BCCD for processing on July 26, 2000). Based on the data in Fields 008, 040 and 955, it is my opinion that the Library of Congress created a Cataloging-in-Publication (CIP) record for *Caputo* on August 2, 1999. After the book was published and the physical copy received by the Library of Congress, the catalogers used the book to verify and enrich data in the record, then sent the book to the Binding and Collections Care

Division for processing on May 10, 2000, and Copy 2 of *Caputo* was added in July of 2000.

60. The CIP Program at the Library of Congress is responsible for cataloging books in advance of publication to alert the library community to forthcoming publications and to facilitate acquisition. The initial CIP record is created based on information submitted by the publisher. When the CIP record is ready, it is sent to the publisher for inclusion in the publication. The Library of Congress distributes CIP records in MARC format to large libraries, bibliographic services, and book vendors. After the book is published, the publisher is obligated to send a copy to the CIP Program, which the CIP catalogers then use to verify and update data in the original CIP record.

61. Field 955 informs my opinion that on August 2, 1999, Library of Congress created a CIP record for *Caputo* as a MARC record, which made *Caputo* discoverable from that date on in the online catalog of the Library of Congress. After the book was published and received by the Library of Congress, CIP catalogers used it to verify and enrich the MARC record on May 3, 2000, and sent the book to processing on May 10, 2000. A customary practice of libraries is to make newly cataloged books available for public access as soon as possible, usually within a week after the cataloging work is completed. The Library of Congress has a large volume of works to process. Based on my experience, it could take one to three

months for a book to be ready for public access. It is therefore my opinion that *Caputo* became discoverable in the online catalog of the Library of Congress on August 2, 1999, when the CIP record was created, and the copy of *Caputo* would have become publicly accessible between June and August of 2000.

62. Field 050 of the MARC record (**Appendix I**) shows this publication has been assigned a Library of Congress Classification (LCC) number “TK5105.8865,” which is the class number for “Internet telephony” (see Class T at https://www.loc.gov/aba/publications/FreeLCC/LCC_T2022TEXT.pdf). Field 082 shows the Dewey Decimal Classification (DDC) Number assigned to this publication is “004.6,” which is the class number for “Computer science, interfacing and communications” (see WebDewey at <https://dewey.org/webdewey/login/login.html>, subscription required for access). Subjects of this publication are also represented by three Library of Congress subject headings in the 650 fields: Internet telephony; Packet switching (Data transmission); and Data integration (Computer science). Field 490 of the MARC record shows “McGraw-Hill technical expert series” appears in the publication, and Field 830 records the authorized form of the series title “Cisco technical expert,” which renders the series title searchable. This MARC record makes *Caputo* discoverable in the Library of Congress online catalog. As a result, users interested in packet switching, data integration, and Internet telephony would have been able to search for and

retrieve this record by the subject terms in the 650 fields, and by the subject areas represented by the LCC number and the DCC number. Users would also have been able to find this book by ISBN, author, title, and series title.

63. Based on the information above, it is my opinion that *Caputo*'s "Cisco Packetized Voice and Data Integration" (**Ex.1021**) is a book that has been made available by the Library of Congress, and anyone interested in the topics covered by the book would have been able to search for it as soon as the CIP record was created on August 2, 1999.

2. Library of Congress Date Stamp

64. The copyright page of *Caputo* in **Ex.1021** bears a stamp showing "LIBRARY OF CONGRESS OCT 07 1999 COPYRIGHT OFFICE," which indicates the date when the Copyright Office received the physical volume of *Caputo*. The stamp has the appearance and distinctive characteristics of a typical check-in date stamp utilized by libraries to indicate the date a publication was received. The date stamp and the cataloging dates in Field 955 of the MARC record (**Appendix I**) inform my opinion that after copy 2 of *Caputo* was received by the Library of Congress on October 7, 1999, the MARC record was updated on July 26, 2000, and copy 2 was sent to BCCD for processing on the same day. This timeline is reasonable, as adding a second copy of a book already in the collection does not require the creation of a new MARC record. The customary library practice is to update the existing record

to reflect the addition and to send the physical item to processing as soon as possible to make the item available for public access. In most academic libraries a newly cataloged book would become available for the public soon after the cataloging record is completed, usually within a week. The Library of Congress has a large volume of materials to process. Based on my experience, it can take one to three months for a newly cataloged work to become ready for public access. It is therefore my opinion that copy 2 of *Caputo* would have become available for public access by October 26, 2000, three months after it was sent to BCCD for processing.

65. Based on the “OCT 07 1999” date stamp placed on the copyright page in copy 2 of *Caputo* (**Ex.1021**), the MARC record (**Appendix I**), the Bibliographic record (**Appendix J**), and my understanding of the ordinary and customary cataloging and processing practices of libraries, it is my opinion that *Caputo* was cataloged by the Library of Congress and became discoverable as early as August 2, 1999, when the CIP record was created. It is also my opinion that copy 2 of *Caputo* (**Ex.1021**) became publicly accessible no later than October 26, 2000, three months after it was sent to BCCD for processing.

3. Copyright Registration Record

66. **Appendix K** is a true and accurate copy of the copyright registration record for *Caputo* obtained from the public catalog of the Copyright Office of the Library of Congress. I obtained **Appendix K** by accessing the Copyright Office website

(<http://www.copyright.gov/>), selecting the hyperlink “Search Copyright Records,” and performing a search by the author, “Caputo, Robert,” on December 14, 2018, to retrieve the record for “Cisco packetized voice and data integration.” I personally located, identified and obtained this record, which experts in my field would reasonably rely upon in forming their opinions.

67. The copyright record (**Appendix K**) shows that “Cisco packetized voice and data integration” was written by “Caputo, Robert.” It also shows the date of creation is “1999,” the date of publication is “1999-08-29” (*i.e.*, August 29, 1999), and copyright registration date is “1999-10-07” (*i.e.*, October 7, 1999). The copyright registration date of October 7, 1999, is consistent with the date stamp information on the copyright page of copy 2 of *Caputo* (**Ex.1021**). The publisher, publication date, and the series information on the copyright registration record match the information contained in **Ex.1021**. The copyright record also shows that *Caputo* has 334 pages, which matches the last numbered page of the book recorded in Field 300 of the MARC record (**Appendix I**), and is consistent with the page number of the last page of **Ex.1021**, which I personally scanned at the Library of Congress.

4. Actual Usage

68. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least four documents published in

2001 that cite *Caputo* (2000), and the earliest citing document was published in March 2001:

- a. Sambanis, K. (March 2001), “Quality of Service for IP-Based Networks,” Naval Postgraduate School, Monterey, California;
- b. Sun, Y., Chen, W. J., & Chen, M. C. (July 2001), Statistical expedited forwarding service for per-flow QoS guarantees, *Quality of Service over Next-Generation Data Networks*, Proceedings SPIE vol. 4524, pp. 214-226, International Society For Optics and Photonics;
- c. Sun, Y. S., Tu, Y. C., & Shih, W. K. (August 2001), Frame-based worst-case weighted fair queueing with jitter control, *IEICE Transactions on Communications*, 84(8), 2266-2278; and
- d. Urie, G. R. (December 2001), “Tactical Voice Communications over Shipboard Local Area Networks,” Naval Postgraduate School, Monterey, California.

69. Taken together, the “OCT 07 1999” date stamp on the copyright page of copy 2 of *Caputo* (**Ex.1021**), the MARC record (**Appendix I**), the Bibliographic record (**Appendix J**), the copyright record (**Appendix K**), and my understanding of the ordinary and customary cataloging and processing practices of libraries inform my opinion that *Caputo* would have been become discoverable at the online catalog of the Library of Congress in August 1999, after the CIP record was created, and copy

2 of *Caputo* would have become publicly available no later than October 26, 2000, three months after it was added to the collection and sent to the BCCD for processing. Citation history indicates that *Caputo* was cited in 2001, at least as early as March 2001.

I. de Moraes (Ex.1022)

70. **Ex.1022** is a true and correct copy of portions of “The Internet multicast from ITS: how it was done and implications for the future” by L. F. M. de Moraes and S. B. Weinstein, published in *IEEE Communications Magazine*, 33(1), January 1995, pp. 6-8. When I began preparing this declaration, I searched WorldCat for the title “The Internet multicast from ITS: how it was done and implications for the future.” The results informed me that the Massachusetts Institute of Technology Libraries (MIT Libraries) held the journal *IEEE Communications Magazine* that published the article by de Moraes and Weinstein. I requested a scanned copy of the article through Wisconsin TechSearch (WTS), a document delivery service based in the University of Wisconsin-Madison, and received the scanned pages from the MIT Libraries on December 5, 2018. The pages in **Ex.1022** include the front cover of *IEEE Communications Magazine*, vol. 33, no. 1, pages preceding the table of contents, the table of contents, and the de Moraes article (pages 6-8 of the magazine).

71. Page 1 of **Ex.1022** is the cover of the “January 1995 Vol. 33 No. 1” issue of the journal *IEEE Communications Magazine*. It carries a label with a date stamp of

“MIT LIBRARIES JAN 19 1995 BARKER.” The cover shows the journal is “a publication of the IEEE Communications Society,” and the title of this issue is “Wireless Personal Communications.” It also shows a label indicating the issue is held at the Barker Engineering Library. Pages 4-5 of **Ex.1022** are the table of contents of this issue. It shows that the ISSN (International Standard Serial Number) of *IEEE Communications Magazine* is “0163-6804” and the journal is “published monthly by The Institute of Electrical and Electronics Engineers, Inc.” in New York, NY. It also shows “Brief Topics in Communications” begins on page 6 of the issue, and pages 6 to 8 of **Ex.1022** are the de Moraes article that appears in this section.

72. This copy of *de Moraes* (**Ex.1022**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1022** was found in the custody of the Massachusetts Institute of Technology Libraries, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *de Moraes* (**Ex.1022**).

1. MIT Libraries Records

73. **Appendix L** is a true and correct copy of the bibliographic record for the journal *IEEE Communications Magazine* that contains *de Moraes*. I retrieved the bibliographic record from the online catalog of the Massachusetts Institute of Technology Libraries by searching for the journal title. I personally located,

identified and obtained this bibliographic record, which experts in my field would reasonably rely upon when forming their opinion. As indicated earlier, a customary library cataloging practice is to create one bibliographic record for a serial and create no records for individual issues of the serial. The bibliographic record (**Appendix L**) shows that “IEEE Communications Society” is the author, “IEEE communications magazine” is the title and the current frequency of the journal is “Monthly.” The bibliographic record also shows its ISSN is “0163-6804,” which matches the ISSN shown on the table of contents page of **Ex.1022**.

74. The “Library Holdings” field of the bibliographic record (**Appendix L**) shows the MIT Libraries hold *IEEE Communications Magazine* in microform, online via the World Wide Web, and in print. Following the link for “Library Storage Annex—Off Campus Collection ; TK.122.C7343,” I retrieved the holdings record. **Appendix N** is a true and correct copy of the holdings record of the MIT Libraries for *IEEE communications magazine*. I located this record, which experts in my field would rely upon in forming their opinion. The record shows that the call number for this journal in the Library Storage Annex is “TK.122.C7343” and the MIT Libraries hold “v.17 (1979)-v.48:no.1-6 (2010) incomplete.” Page 2 of **Appendix N** shows that “v. 33:no.1-6 (1995)” are available and the status is “In Library” (*i.e.*, available for user requests).

75. **Appendix M** is the true and correct copy of the MARC record for *IEEE Communications Magazine* that contains *de Moraes*. I obtained the MARC record by following the “MARC tags” link shown on the bibliographic record (**Appendix L**, page 1). The first six digits of Field 008 show the MARC record was created on “781213” (*i.e.*, December 13, 1978). It is followed by “c19799999,” which indicates the publication is a continuing resource that began publication in 1979 and is ongoing. Subfield “a” of Field 040 identifies “NSD” (National Serials Data Program located at the Library of Congress) as the original creator of this record, and the last subfield “d” identifies “MYG” as one of the libraries that used the original MARC record to create a copy cataloging record. According to the *Directory of OCLC Members* (<https://www.oclc.org/en/contacts/libraries.html>), MYG is the OCLC library symbol for the Massachusetts Institute of Technology Libraries. Field 245 shows the title of this journal is “IEEE communications magazine” and Field 022 shows “0163-6804” is the ISSN assigned to this journal. Field 260 shows “Communications Society of Institute of Electrical and Electronics Engineers” in New York as the publisher. Field 310 shows “Monthly” as the publication frequency since “Aug. 1983,” and Field 362 indicates the publication began with “v. 17- Jan. 1979.” Field 530 indicates the journal is “[a]lso available by subscription via the World Wide Web.” Twelve 510 fields identify indexing and abstracting services that index this journal, making its articles discoverable.

76. Field 050 of the MARC record (**Appendix M**) shows this publication has been assigned a Library of Congress Classification (LCC) number, “TK5101.A1,” which is the class number for “Telecommunication periodicals” (see Class T at https://www.loc.gov/aba/publications/FreeLCC/LCC_T2022TEXT.pdf). Field 082 shows the Dewey Decimal Classification (DDC) Number assigned to this publication is “621/.38/05,” which is the class number for “Electronics, communications engineering periodicals” (see WebDewey at <https://dewey.org/webdewey/login/login.html>, subscription required for access). The subject of this journal is also represented by a Library of Congress subject headings in Field 650, with “Telecommunication” as the main heading and “Periodicals” as the subdivision. This MARC record renders *IEEE Communications Magazine*, which contains *de Moraes* (**Ex.1022**), discoverable in the online catalog of the MIT Libraries. As a result, users interested in telecommunication would have been able to search for this journal by the subject term in Field 650 and by the LCC number and the DDC number. Users would also have been able to find this journal by its ISSN, author, and title.

2. MIT Libraries Date Stamp

77. The cover of the journal in **Ex.1022** bears a stamp showing “MIT LIBRARIES JAN 19 1995 BARKER,” indicating the date when the Barker Library at MIT received the January 1995, vol. 33, no. 1 issue of *IEEE Communications*

Magazine. The stamp has the appearance and distinctive characteristics of a typical check-in date stamp utilized by libraries to indicate the date a publication was received by the library. Based on my knowledge and understanding of library serial check-in practice and the typical effort to make new journal issues available to users as soon as possible, it is my opinion that vol. 33, no. 1 of *IEEE Communications Magazine*, which contains *de Moraes*, would have been publicly accessible by January 26, 1995, a week after it was checked in at the MIT Libraries. If the workload was very heavy at the time, it might take more than one week for the new issue to become available to users.

3. Actual Usage

78. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least three documents published in 1996 and 1997 that cite the “The Internet multicast from ITS: how it was done and implications for the future” (1995) by *de Moraes* and *Weinstein*:

- a. Liu, L. G. (1996), *The Internet and Library and Information Services: Issues, Trends, Annotated Bibliography, 1994-1995* (No. 10), Greenwood Publishing Group;
- b. Maxemchuk, N. F. (1997), Video distribution on multicast networks, *IEEE Journal on Selected Areas in Communications*, 15(3), 357-372; and

- c. Maxemchuk, N. F., Padmanabhan, K., & Lo, S. (October 1997), A cooperative packet recovery protocol for multicast video,” in Proceedings 1997 International Conference on Network Protocols, pp. 259-266.

J. Freedman (Ex.1027)

79. **Ex.1027** is a true and correct copy of portions of “Computer Desktop Encyclopedia” (9th edition) by Alan Freedman that I made on December 7, 2018, during my personal visit to the Library of Congress. Because books published in the United States tend to be registered with the Copyright Office of the Library of Congress and cataloged by the Library of Congress, I searched the online catalog of the Library of Congress by the title of *Freeman* to determine if the library held this book. The search results confirmed the holdings information, and the holdings record showed this book was stored offsite but could be requested in the “Machine Readable Collections” of the Library of Congress. I requested access to this title and received the physical volume on December 7, 2018, at the Microform and Electronic Resources Center in the Library of Congress Jefferson Building. This scanned copy is presented as **Ex.1027** in this declaration.

80. **Ex.1027** is a true and correct copy of portions of *Freedman* that I made on December 7, 2018, while the book was in my possession at the Library of Congress. I produced **Ex.1027** by personally scanning the front matter (the front cover, the title page, the copyright page, the “about the author” page) and select content pages from

Freedman, including pages 438 and 1,124 (the last numbered page), the back cover of the book, and the spine of the volume.

81. The title page (page 2) of **Ex.1027** shows that “Computer Desktop Encyclopedia” is the title, “Alan Freedman” is the author, and this is the “Ninth Edition” of this title. The title page also shows Osborne/McGraw-Hill of New York as the publisher. Page 3 is the copyright page that shows a stamp of “LIBRARY OF CONGRESS SEP 27 2001 CIP” and a copyright date of “2001” with The McGraw-Hill Companies as the copyright holder. The copyright page also shows the title’s ISBN as “0-07-219306-9.” Page 4 is the “About the Author” page that shows a handwritten call number “QA76.15.F732 2001 copy 1 MRC.” The spine of the book (page 9) shows a call number label of “FT MEADE MRC QA 76.15.F732 2001 Copy 1.”

82. This copy of *Freedman* (**Ex.1027**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1027** was found in the custody of the Library of Congress, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this scanned copy of *Freedman* (**Ex.1027**).

1. Library of Congress Records

83. **Appendix O** is a true and correct copy of the MARC record for *Freedman*. I retrieved this record from the online catalog of the Library of Congress by searching for the book title “Computer desktop encyclopedia,” selecting the hyperlink for the 2001 publication of the book, and selecting the “MARC tags” tab. I personally located, identified and obtained this record, which experts in my field would reasonably rely upon in forming their opinions.

84. **Appendix P** is a true and correct copy of the Bibliographic record for *Freedman*. I retrieved this record from the online catalog of the Library of Congress by searching for the book title “Computer desktop encyclopedia,” and selecting the hyperlink for the 2001 publication of the book. I personally located, identified and obtained this record, which experts in my field would reasonably rely upon in forming their opinions.

85. Field 245 of the MARC record (**Appendix O**) and the title field of the Bibliographic record (**Appendix P**) identify the book title as “Computer desktop encyclopedia.” Field 100 of the MARC record and the Personal name field of the Bibliographic record identify the author as “Freedman, Alan.” Field 250 of the MARC record and the Edition field of the Bibliographic record identify this version as the “9th ed.” Field 260 of the MARC record and the published/created field of the Bibliographic record show that *Freedman* was published by Osborne/McGraw-

Hill of New York in 2001. Field 300 shows the item has 1124 pages and is accompanied by “1 computer optical disk (4 3/4 in.).” Field 020 of the MARC record and the ISBN field of the Bibliographic record show “0072193069” as the ISBN assigned to Freedman. The title, author, publisher, publication date, and the ISBN in the MARC record and the Bibliographic record match the information contained in **Ex.1027**.

86. The first six digits of field 008 show the MARC record was first created on “011003” (*i.e.*, October 3, 2001). Field 040 subfield “a” shows that “DLC” is the library that created the original MARC record. According to the *Directory of OCLC Members* (<https://www.oclc.org/en/contacts/libraries.html>), “DLC” is the OCLC library symbol for the Library of Congress. Field 955 is a local note field that records the cataloging activity dates. The data informs me that the MARC record was first created on “2001-10-03” (*i.e.*, October 3, 2001), and that after the Dewey Decimal Classification (DDC) Number was assigned on “11-21-01” (*i.e.*, November 21, 2001), the record was edited on “2001-12-05” (*i.e.*, December 5, 2001).

87. Field 050 of the MARC record (**Appendix O**) shows this publication has been assigned a Library of Congress Classification (LCC) number “QA76.15,” which is the class number for dictionaries and encyclopedia in computer science (see Class Q at https://www.loc.gov/aba/publications/FreeLCC/LCC_Q2022TEXT.pdf). Field 082 shows the DDC Number assigned to this publication is “004/03,” which is the

class number for “computer science dictionaries, encyclopedia, concordances” (see WebDewey at <https://dewey.org/webdewey/login/login.html>, subscription required for access). The subjects of this publication are also represented by a Library of Congress subject heading in Field 650 that has “Computers” as the main heading, followed by a subfield “x” indicating this publication is “Dictionaries.” This MARC record renders Freedman discoverable in the Library of Congress online catalog as of October 3, 2001, when the original record was created. As of that date, users interested in dictionaries about computer science would have been able to search for and retrieve this record by the subject term in Field 650 and by the LCC number and the DCC number. Users would also have been able to discover this book by its ISBN, author, and title.

88. Based on the information above, it is my opinion that *Computer Desktop Encyclopedia* by Freedman (**Ex.1027**) is a book that has been made discoverable by the Library of Congress since October 3, 2001, meaning that anyone who was interested in the topics covered by the book would be able to find it.

2. Library of Congress Date Stamp

89. The copyright page of *Freedman* in **Ex.1027** bears a stamp showing “LIBRARY OF CONGRESS SEP 27 2001 CIP,” which indicates the date when the Cataloging in Publication Program of the Library of Congress received the physical volume of Freedman. The stamp has the appearance and distinctive characteristics

of a typical check-in date stamp utilized by libraries to indicate the date that a publication was received by the library. The date stamp and the cataloging dates in Field 955 of the MARC record (**Appendix O**) inform my opinion that after copy 1 of *Freedman* was received by the Library of Congress on September 27, 2001, the MARC record was created on October 3, 2001, and edited on December 5, 2001. In most academic libraries a newly cataloged book would become available to the public soon after the cataloging record is completed, usually within a week. The Library of Congress has a large volume of materials to process. Based on my experience, it can take one to three months for a newly cataloged work to become ready for public access. It is therefore my opinion that *Freedman* would have been discoverable in the online catalog of the Library of Congress from October 3, 2001 on, and the copy would have become available for public access between November 3, 2001, and January 3, 2002.

90. Based on the “SEP 27 2001” date stamp placed on the copyright page in *Freedman* (**Ex.1027**), the MARC record (**Appendix O**), the Bibliographic record (**Appendix P**), and my understanding of the ordinary and customary cataloging and processing practices of libraries, it is my opinion that *Freedman* (**Ex.1027**) was cataloged and became discoverable by October 3, 2001, and the physical copy would have become accessible to the public no later than January 3, 2002.

3. Copyright Registration Record

91. **Appendix Q** is a true and accurate copy of the copyright registration record obtained from the public catalog of the Copyright Office of the Library of Congress.

I obtained **Appendix Q** by accessing the Copyright Office website (<http://www.copyright.gov/>), selecting the hyperlink “Search Copyright Records,” and performing a search by the title, “Computer desktop encyclopedia,” on December 14, 2018. I personally located, identified and obtained this record, which experts in my field would reasonably rely upon in forming their opinions.

92. The copyright registration record shows that “Computer desktop encyclopedia” was written by “Freedman, Alan” and the record represents the 9th edition. The record shows that the date of creation is “2001,” the date of publication is “2001-08-13” (*i.e.*, August 13, 2001), and the copyright registration date is “2001-10-25” (*i.e.*, October 25, 2001). The copyright registration record (Appendix Q) and the Library of Congress copy of Freeman (Ex.1027) inform me that this book was published on August 13, 2001, a copy was received by the Library of Congress on September 27, 2001, and the book was registered with the Copyright Office on October 25, 2001. The publisher, publication date, and the copyright holder information on the copyright record also match the information contained in **Ex.1027**. The copyright registration record also shows that *Freedman* has 1124 pages plus a CD-ROM, which matches the last numbered page of the book recorded

in Field 300 of the MARC record (**Appendix O**) and is consistent with the page number of the last page of **Ex.1027**, which I personally scanned at the Library of Congress.

4. Actual Usage

93. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least two documents published in 2002 that cited *Computer Desktop Encyclopedia* (2001) by Freedman, and the earliest citing document was published in August 2002:

- a. Dori, D. (August 2002), A taste of OPM, in *Object-Process Methodology*, pp. 3-11, Springer, Berlin, Heidelberg; and
- b. Castelli, M. J. (November 2002), *Network Sales and Services Handbook*, Cisco Press.

94. Taken together, the “SEP 27 2001” date stamp on the copyright page of *Freedman* (**Ex.1027**), the MARC record (**Appendix O**), the Bibliographic record (**Appendix P**), the copyright record (**Appendix Q**), and my understanding of the ordinary and customary cataloging and processing practices of libraries inform my opinion that *Freedman* (**Ex.1027**) would have been cataloged and discoverable by the public at the online catalog of the Library of Congress on October 3, 2001. Because the DDC number was assigned in November 2001 and the library record

was last edited on December 5, 2001, the copy would have been available for public access no later than March 5, 2002.

K. VPN Textbook (Ex.1010)

95. **Ex.1010** is a true and correct copy of portions of *MPLS and VPN Architectures* by Jim Guichard and Ivan Pepelnjak that I made on November 30, 2018, during my personal visit to the Library of Congress. I searched the Library of Congress online catalog for records Because books published in the United States tend to be registered with the Copyright Office of the Library of Congress and cataloged by the Library of Congress, I searched the online catalog of the Library of Congress by the title of the *VPN Textbook* to determine if the library held this book. The search results confirmed the holdings information, and the holdings record showed the book could be requested at the “Jefferson or Adams Building Reading Rooms” and the status of the books is “Not Charged,” meaning it was available. I requested access to this title and received the physical volume on November 30, 2018, at the Library of Congress Science and Business Reading Room in the Adams Building. This scanned copy is presented as **Ex.1010** in this declaration.

96. **Ex.1010** is a true and correct copy of portion of the *VPN Textbook* that I made on November 30, 2018, while the book was in my possession at the Library of Congress. I produced **Ex.1010** by personally scanning the front matter (the front cover, the title page, the copyright page, and the table of contents) and select content

pages from the *VPN Textbook*, including pages 115-133 and 424 (the last numbered page), the back cover, and the spine of the book.

97. The front cover and title page of **Ex.1010** show that “MPLS and VPN Architectures” is the title. The front cover shows “Ivan Pepelnjak” and “Jim Guichard” as the authors, and the title page shows “Jim Guichard” and “Ivan Pepelnjak” as the authors. The title page also shows that Cisco Press of Indianapolis, IN is the publisher. The copyright page shows a copyright date of “2001” with Cisco Press as the copyright holder. The copyright page also shows this copy is the “3rd Printing March 2001,” the “Library of Congress Cataloging-in-Publication Number” is “00-105168” and the ISBN of this work is “1-58705-002-1,” which is also shown on the back cover. The copyright page bears a stamp of “LIBRARY OF CONGRESS APR 23 2001 CIP.” The spine shows a call number label of “TK 5105.573 .G85 2001 V. 1 Copy 1.”

98. This copy of the *VPN Textbook* (**Ex.1010**) is in a condition that creates no suspicion about its authenticity. Specifically, the text on the pages flows seamlessly from one page to the next, and there are no visible alterations to the work. Moreover, **Ex.1010** was found in the custody of a national library, a place where, if authentic, it would likely be found. I therefore see no reason to question the authenticity of this scanned copy of the *VPN Textbook* (**Ex.1010**).

1. Library of Congress Records

99. **Appendix R** is a true and correct copy of the MARC record for the *VPN Textbook*. I retrieved this record from the online catalog of the Library of Congress by searching for the book title “MPLS and VPN architectures.” I personally located, identified and obtained this record, which experts in my field would reasonably rely upon in forming their opinions.

100. **Appendix S** is a true and correct copy of the Bibliographic record for the *VPN Textbook*. I retrieved this record from the online catalog of the Library of Congress. I personally located, identified and obtained this Bibliographic Record Information, which experts in my field would reasonably rely upon in forming their opinions.

101. Field 245 of the MARC record (**Appendix R**) and the title field of the Bibliographic record (**Appendix S**) identify the book title as “MPLS and VPN architectures.” Field 300 of the MARC record and the description field of the Bibliographic record show that the *VPN Textbook* has two physical volumes. As a result, Field 260 of the MARC record and the “published/created” field in the Bibliographic record show the publication dates as “2001-2003,” with the first date “2001” representing the date of volume 1, portions of which have been included in **Ex.1010**, and “2003” representing the publication date of volume 2. Field 100 of the MARC record and the Personal name field of the Bibliographic record identify the author as “Guichard, Jim,” and the record further shows “Pepelnjak, Ivan” and

“Apcar, Jeff” as contributors of this publication. Field 260 of the MARC record and the published/created field of the Bibliographic record show that Cisco Press of Indianapolis, IN published this title from 2001 to 2003. Field 010 of the MARC record and the LCCN field of the Bibliographic record show the Library of Congress Control Number for this title is “00105168,” which matches the information on the copyright page of **Ex.1010**. The first Field 020 of the MARC record and the ISBN field of the Bibliographic record show that the ISBN of volume 1 of this title is “1587050021,” which matches the ISBN on the copyright page and the back cover of **Ex.1010**.

102. The first six digits of Field 008 of the MARC record inform me that the MARC record was first created on “000601” (*i.e.*, June 1, 2000). The “m20012003” code following the record creation date indicates the *VPN Textbook* was published from 2001 to 2003. Field 040 subfield “a” shows that “DLC” is the library that created the original MARC record. According to the *Directory of OCLC Members* (<https://www.oclc.org/en/contacts/libraries.html>), “DLC” is the OCLC library symbol for the Library of Congress. Field 955 is a local note field that records the cataloging activity dates. The data informs me that the MARC record was first created on “06-01-00” (*i.e.*, June 1, 2000), and that the record was last edited on “2001-12-21” (*i.e.*, December 21, 2001). In addition, Field 955 shows that vol. 2 ISBN was added to the record on “2004-06-02.” The fact that a record was created

in June 2000 for a title with a publication date of 2001 informs my opinion that the initial MARC record was a CIP (Cataloging-in-Publication) record. The date stamp of “LIBRARY OF CONGRESS APR 23 2001 CIP” and the Library of Congress Cataloging-in-Publication Number: 00-105168” on the copyright page of **Ex.1010** confirm the original record was a CIP record.

103. The CIP Program at the Library of Congress is responsible for cataloging books in advance of publication to alert the library community to forthcoming publications and to facilitate acquisition. The initial CIP record is created based on information submitted by the publisher. When the CIP record is ready, it is sent to the publisher for inclusion in the publication. The Library of Congress distributes CIP records in MARC format to large libraries, bibliographic services, and book vendors around the world. After the book is published, the publisher is obligated to send a copy to the CIP Program, which CIP catalogers use to verify and update data in the original CIP record.

104. Field 955 informs my opinion that the Library of Congress cataloged the *VPN Textbook* and created a CIP record for it on June 1, 2000, making the book discoverable in the online catalog of the Library of Congress. Field 955 shows volume 2 was added to the library collection in 2004.

105. Field 050 of the MARC record (**Appendix R**) shows this publication has been assigned a Library of Congress Classification (LCC) number of “TK5105.573,”

which is the class number for “MPLS” (see Class T at https://www.loc.gov/aba/publications/FreeLCC/LCC_T2022TEXT.pdf). Field 082 shows the DDC Number assigned to this publication is “004.6,” which is the class number for “Computer science, interfacing and communications” (see WebDewey at <https://dewey.org/webdewey/login/login.html>, subscription required for access). Subjects of this publication are also represented by three Library of Congress subject headings in Fields 650: MPLS standard; Computer network architectures; and Extranets (Computer networks). This MARC record renders the *VPN Textbook* searchable in the Library of Congress online catalog as early as June 1, 2000, when the CIP record was created, and no later than December 21, 2001, when the original MARC record was edited. By at least December 2001, users interested in these topics would have been able to search for and retrieve this record by the subject terms in Fields 650 and by the LCC number and the DCC number. Users also would have been able to find this book by its ISBN, author, and title.

106. Based on the information above, it is my opinion that *MPLS and VPN Architectures* (**Ex.1010**) is a book that has been made available by the Library of Congress, meaning that anyone who was interested in the topics covered by the book would be able to search for and access it.

2. Library of Congress Date Stamp

107. The copyright page of the *VPN Textbook* in **Ex.1010** bears a stamp showing “LIBRARY OF CONGRESS APR 23 2001 CIP,” which indicates the date when the CIP Program of the Library of Congress received the physical copy of volume 1 of the *VPN Textbook*. The stamp has the appearance and distinctive characteristics of a typical check-in date stamp utilized by libraries to indicate the date that a publication was received by the library. The date stamp and the cataloging dates in Field 955 of the MARC record (**Appendix R**) inform my opinion that a CIP record was created on June 1, 2000, the record was verified by CIP catalogers after volume 1 of the *VPN Textbook* was received by CIP on April 23, 2001, and the record was last edited on December 21, 2001. In most academic libraries a newly cataloged book would become available to the public soon after the cataloging record is completed, usually within a week. Considering the volume of materials the Library of Congress typically processes, together with my experience with their collection, it is my opinion that the *VPN Textbook* (**Ex.1010**) would have become discoverable from June 1, 2000, on when the CIP record was created. After the MARC record was edited on December 21, 2001, the record was completed and interested users would have been able to conduct subject searches to discover this book, in addition to using the ISBN, title, and authors to find this book. The copy of volume 1 would have become publicly accessible between January 21 and March 21 of 2002.

3. Copyright Registration Record

108. **Appendix T** is a true and accurate copy of the copyright registration record obtained from the public catalog of the Copyright Office of the Library of Congress.

I obtained **Appendix T** by accessing the Copyright Office website (<http://www.copyright.gov/>), selecting the hyperlink “Search Copyright Records,” and performing a search for “Pepelnjak,” the name of one of the authors, on January 2, 2019. I personally located, identified and obtained this record, which experts in my field would reasonably rely upon in forming their opinions.

109. The copyright registration record shows “MPLSand VPN architectures” in the title field, missing a space between the first two words. However, the rest of the information is the same as the information contained in **Ex.1010**. For example, the copyright record shows that this title was written by “Guichard, Jim” and “Pepelnjak, Ivan,” the date of creation is “2000,” and the date of publication is “2000-10-31” (*i.e.*, October, 31, 2000). The imprint field shows that Cisco Press of Indianapolis published the title in 2001, and the registration date is “2001-04-19.” In addition, the record shows the title has 424 pages, which matches the last numbered page of the *VPN Textbook* (**Ex.1010**), which I personally scanned at the Library of Congress.

4. Actual Usage

110. Actual usage of a publication is reflected by papers that make reference to it. My research on Google Scholar has identified at least four documents published in 2002 and 2003 that cite *MPLS and VPN Architectures* (2001):

- a. Bhagavathula, R., Thanthry, N., Lee, W., & Pendse, R. (August 2002), Mobility: a VPN perspective [mobile computing], in *The 2002 45th Midwest Symposium on Circuits and Systems, 2002. MWSCAS-2002* <<Conference dates: 4-7 Aug. 2002>>;
- b. Bhagavathula, R., Thanthry, N., & Pendse, R. (September 2002), Mobile IP and virtual private networks, in *Proceedings IEEE 56th Vehicular Technology Conference, 2002*, pp. 2414-2418 vol. 4 , <<Conference dates: 24-28 Sept. 2002>>;
- c. Báez Marín, J. G. (November 2002), Estudio y diseño de una red basada en tecnología MPLS para un carrier de datos, Bachelor's Thesis, Escuela Politécnica Nacional; and
- d. Metz, C. (2003), The latest in virtual private networks: part I, *IEEE Internet Computing*, vol. 7, no. 1, pp. 87-91, Jan.-Feb. 2003.

111. Taken together, the “APR 23 2001” date stamp on the copyright page of the *VPN Textbook* (**Ex.1010**), the MARC record (**Appendix R**), the Bibliographic record (**Appendix S**), the copyright record (**Appendix T**), and my understanding of

the ordinary and customary cataloging and processing practices of libraries inform my opinion that the *VPN Textbook* (**Ex.1010**) would have become discoverable by the public at the online catalog of the Library of Congress by June 1, 2000. After the CIP record was verified on April 23, 2001 and the record edited on December 21, 2001, the copy would have been sent to processing, so the physical volume of volume 1 would have been available for public access no later than March 21, 2002.

VI. CONCLUSION

112. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case. If cross-examination is required of me, I will appear.

VII. DECLARATION

113. I hereby declare that, to the best of my knowledge and understanding, and based on the materials available to me at the time of signing this Declaration, all statements and opinions in this Declaration are true or believed to be true. I further declare that all statements made in this Declaration of my own knowledge 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 18 U.S.C. § 1001.

Executed this first day of December, 2022.

By: Ingrid Hsieh-Yee

Ingrid Hsieh-Yee, Ph.D.

Appendix A

[Library of Congress](#) >> [MARC](#) >> [Understanding MARC](#)

MARC 21 Reference Materials

[Part VII: A Summary of Commonly Used MARC 21 Fields](#)

[Part VIII: A List of Other Fields Often Seen in MARC Records](#)

[Part IX: The Leader](#)

[Part X: Field 008 for Books](#)

Part VII:

A Summary of Commonly Used MARC 21 Fields

This is a summary of the MARC 21 tags used most frequently by libraries in entering their own bibliographic records. For full listings of all MARC 21 tags, indicators, and subfield codes, see *MARC 21 Format for Bibliographic Data*.

In the explanations on these pages:

Tags -- The tags (3-digit numbers) are followed by the names of the fields they represent. In this summary, and in the *MARC 21 Format for Bibliographic Data*, if a tag can appear more than once in one bibliographic record, it is labeled repeatable (R). If it can only be used once, it is labeled non-repeatable (NR). For example, a catalog record can have several subjects, so the tags for subject added entries (6XX) are labeled repeatable (R).

Indicators -- The use of indicators is explained in fields where they are used. Indicators are one-digit numbers. Beginning with the 010 field, in every field -- following the tag -- are two character positions, one for Indicator 1 and one for Indicator 2. The indicators are not actually defined in all fields, however. And it is possible that a 2nd indicator will be used, while the 1st indicator remains undefined (or vice versa). When an indicator is undefined, the character position will be represented by the character # (for blank space).

Subfield codes -- All the data in each field (beginning with the 010 field) is divided into subfields, each of which is preceded by a delimiter-subfield code combination. The most common subfield codes used with each tag are shown. Each subfield code is preceded by the character \$, signifying a delimiter. The name of the subfield follows the code.

In general, every field **MUST** have a subfield 'a' (**\$a**). One exception that is often seen is in Field 020 (ISBN), when the ISBN information (subfield **\$a**) is unavailable but the price (subfield **\$c**) is known. Some subfields are repeatable. In this summary, repeatability is noted for only the more common repeatable subfields.

Examples: Examples follow the explanation for each field. For clarity, one space has been placed between the tag and the first indicator, one space has been placed between the second indicator and the first delimiter- subfield code, and one space has been inserted between the delimiter-subfield code and the subfield data.

010 Library of Congress Control Number -- (LCCN)
(NR, or Not Repeatable)

Indicators undefined.

Subfield used most often:

\$a -- Library of Congress control number

Example: 010 ## \$a ###86000988#

020 International Standard Book Number -- (ISBN)

(R, or Repeatable)

Indicators undefined.

Subfields used most often:

\$a -- International Standard Book Number

\$c -- Terms of availability (often a price)

\$z -- Cancelled/invalid ISBN (R)

Example: 020 ## \$a 0877547637

040 Cataloging source -- (NR)

Indicators undefined.

Subfields used most often:

\$a -- Original cataloging agency

\$c -- Transcribing agency

\$d -- Modifying agency (R)

Example: 040 ## \$a DLC
 \$c DLC
 \$d gwhs

100 Main entry -- Personal name -- (primary author)

(NR; there can be only one main entry)

Indicator 1: Type of personal name entry element

0 -- Forename

1 -- Surname (this is the most common form)

3 -- Family name

Indicator 2 undefined.

Indicator 2 became obsolete in 1990. Older records may display 0 or 1

Subfields used most often:

\$a -- Personal name

\$b -- Numeration

\$c -- Titles and other words associated with a name (R)

\$q -- Fuller form of name

\$d -- Dates associated with a name (generally, year of birth)

Example: 100 1# \$a Gregory, Ruth W.
\$q (Ruth Wilhelme),
\$d 1910-

130 Main entry -- Uniform title -- (NR)

Indicator 1: Nonfiling characters

0-9 -- Number of nonfiling characters present (for initial articles, including spaces)

Indicator 2 undefined.

Indicator 2 became obsolete in 1990. (See 100 above.)

Subfields used most often:

\$a -- Uniform title

\$p -- Name of part/section of a work (R)

\$l -- Language of a work

\$s -- Version

\$f -- Date of a work

Example: 130 0# \$a Bible.
\$p O.T.
\$p Psalms.

240 Uniform title (NR)

Indicator 1: Uniform title printed or displayed

0 -- Not printed or displayed

1 -- Printed or displayed (most common)

Indicator 2: Nonfiling characters

0-9 -- Number of nonfiling characters present (for initial articles, including spaces)

Subfields used most often:

\$a -- Uniform title

\$l -- Language of a work

\$f -- Date of a work

Example: 240 10 \$a Ile mystérieuse.
\$l English.
\$f 1978

245 Title Statement (NR)

Indicator 1: Title added entry

(Should the title be indexed as a title added entry?)

0 -- No title added entry

(indicates a title main entry; i.e. no author is given)

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1 -- Title added entry

(the proper indicator when an author given in 1XX; the most common situation)

Indicator 2: Nonfiling characters

- 0-9 -- Number of nonfiling characters present, including spaces; usually set at zero, except when the title begins with an article; e.g., for *The robe*, the second indicator would be set to 4. The letters *T*, *h*, *e*, and the space following them are then ignored in alphabetizing titles. The record will be automatically filed under "r" -- for *Robe*.

Subfields used most often:

- \$a** -- Title proper
\$h -- Medium (often used for non-book media)
\$p -- Name of part/section of a work (R)
\$b -- Reminder of title (subtitles, etc.)
\$c -- Remainder of title page transcription/Statement of responsibility

Example: 245 14 \$a The DNA story :
 \$b a documentary history of gene
 cloning /
 \$c James D. Watson, John Tooze.

246 Varying form of title (R)*Indicator 1: Note/title added entry controller*

- 1 -- Note, title added entry
 3 -- No note, title added entry

Indicator 2: Type of title

- # -- No information provided
 0 -- Portion of title
 1 -- Parallel title
 4 -- Cover title
 8 -- Spine title

Subfield used most often:

- \$a** -- Title proper

Example: 246 3# \$a Four corners power review

250 Edition statement (NR)*Indicators undefined.**Subfield used most often:*

- \$a** -- Edition statement

Example: 250 ## \$a 6th ed.

260 Publication, distribution, etc. (Imprint) (R)

Indicator 1: Sequence of publishing statements

-- No information provided

Indicator 2: Undefined

Subfields used most often:

\$a -- Place of publication, distribution, etc. (R)

\$b -- Name of publisher, distributor, etc. (R)

\$c -- Date of publication, distribution, etc. (R)

Example: 260 ## \$a New York :
 \$b Chelsea House,
 \$c 1986.

300 Physical description (R)

Indicators undefined.

Subfields used most often:

\$a -- Extent (number of pages) (R)

\$b -- Other physical details (usually illustration information)

\$c -- Dimensions (cm.) (R)

\$e -- Accompanying material (for example, "teacher's guide" or "manual")

Example: 300 ## \$a 139 p. :
 \$b ill. ;
 \$c 24 cm.

440 Series statement / Added entry--Title

This field was made obsolete in 2008 to simplify the series statement. See 490 and 830.

490 Series statement (No added entry is traced from field) (R)

Indicator 1: Specifies whether series is traced (whether an 8XX tag is also present)

0 -- Series not traced

1 -- Series traced (8XX is in record)

Indicator 2 undefined.

Subfield used most often:

\$a -- Series statement (R)

\$v -- Volume number (R)

Example: 490 1# \$a Colonial American craftsmen

500 General note (R)

Indicators undefined.

Subfield used most often:

\$a -- General note (Used when no specialized note field has been defined for the information. Examples: Notes regarding the index; the source of the title; variations in title; descriptions of the nature, form, or scope of the item.)

Example: 500 ## \$a Includes index.

504 Bibliography, etc. note (R)

Indicators undefined.

Subfield used most often:

\$a -- Bibliography, etc. note

Example: 504 ## \$a Includes bibliographical references.

505 Formatted contents note (R)

Indicator 1: Type of contents note

0 -- Complete contents

1 -- Incomplete contents (used with multivolume set when some volumes are not yet published)

2 -- Partial contents

Indicator 2: Level of content designation

-- Basic

Subfield used most often:

\$a -- Formatted contents note

Example: 505 0# \$a Pride and prejudice -- Emma
-- Northanger Abbey.

520 Summary, etc. note (R)

Indicator 1: Display constant controller

-- Summary

1 -- Review

2 -- Scope and content

3 -- Abstract

Indicator 2 undefined

Subfields used most often

\$a -- Summary, abstract, or annotation

\$b -- Expansion of summary note

Example: 520 ## \$a This basic guide to parliamentary procedure tells how to conduct and participate in a meeting properly.

600 Subject added entry -- Personal name (R)

Indicator 1: Type of personal name entry element

- 0 -- Forename
- 1 -- Surname (this is the most common form)
- 3 -- Family name

Indicator 2: Subject heading system/thesaurus (identifies the specific list or file which was used)

- 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

(Note regarding Sears subject headings: The MARC 21 format does not provide an assigned indicator for Sears subject headings. Therefore, an indicator of 7 is used, and the MARC defined code "sears" is placed in subfield \$2.)

Subfields used most often:

- \$a** -- Personal name (surname and forename)
- \$b** -- Numeration
- \$c** -- Titles and other words associated with a name (R)
- \$q** -- Fuller form of name
- \$d** -- Dates associated with a name (generally, year of birth)
- \$t** -- Title of a work
- \$v** -- Form subdivision (R)
- \$x** -- General subdivision (R)
- \$y** -- Chronological subdivision (R)
- \$z** -- Geographic subdivision (R)
- \$2** -- Source of heading or term (used with 2nd indicator of 7)

Example: 600 10 \$a Shakespeare, William,
 \$d 1564-1616
 \$x Comedies
 \$x Stage history.

Example: 600 10 \$a Shakespeare, William,
 \$d 1564-1616
 \$x Knowledge

\$z Rome
\$v Congresses.

Notice that subfields \$v, \$x, and \$z in the 600 field are repeatable. Subfields \$v, \$x, \$y, and \$z do not have to be in alphabetical order. They will be in the order prescribed by the instructions given by the subject heading system.

610 Subject added entry -- Corporate name (R)

Indicator 1: Type of corporate name entry element

0 -- Inverted name (not used with AACR2)

1 -- Jurisdiction name

2 -- Name in direct order

Indicator 2: Subject heading system/thesaurus.

See indicator 2 under 600

Subfields used most often:

\$a -- Corporate name or jurisdiction name as entry element

\$b -- Subordinate unit (R)

\$v -- Form subdivision (R)

\$x -- General subdivision (R)

\$y -- Chronological subdivision (R)

\$z -- Geographic subdivision (R)

\$2 -- Source of heading or term (used with 2nd indicator of 7)

Example: 610 10 \$a United States.
 \$b Army Air Forces
 \$v Biography.

650 Subject added entry -- Topical term (Most subject headings fit here.) (R)

Indicator 1: Level of subject

-- No information provided

Indicator 2: Subject heading system/thesaurus

(identifies the specific list or file which was used)

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

Note regarding Sears subject headings: The MARC 21 format does not provide an assigned indicator for Sears subject headings. Therefore, an indicator of 7 is used, and the MARC defined code "sears" is placed in subfield \$2.)

Subfields used most often:

\$a -- Topical term

\$v -- Form subdivision (R)

- \$x** -- General subdivision (R)
- \$y** -- Chronological subdivision (R)
- \$z** -- Geographic subdivision (R)
- \$2** -- Source of heading or term used with 2nd indicator of 7)

Example: 650 #0 \$a Theater
 \$z United States
 \$v Biography
 \$v Dictionaries.

Notice that subfields \$v, \$x, and \$z in the 650 field are repeatable. Subfields \$v, \$x, \$y, and \$z do not have to be in alphabetical order. They will be in the order prescribed by the instructions given by the subject heading system.

651 Subject added entry -- Geographic name (R)

Indicator 1: undefined.

Indicator 2: Subject heading system/thesaurus.

See indicator 2 under 600

Subfields used most often:

- \$a** -- Geographic name
- \$v** -- Form subdivision (R)
- \$x** -- General subdivision (R)
- \$y** -- Chronological subdivision (R)
- \$z** -- Geographic subdivision (R)
- \$2** -- Source of heading or term (used with 2nd indicator of 7)

Example: 651 #0 \$a United States
 \$x History
 \$v Chronology.

Notice that subfields \$v, \$x, and \$z in the 651 field are repeatable. Subfields \$v, \$x, \$y, and \$z do not have to be in alphabetical order. They will be in the order prescribed by the instructions given by the subject heading system.

700 Added entry -- Personal name (R)

Indicator 1: Type of personal name entry element

- 0 -- Forename
- 1 -- Surname (this is the most common form)
- 3 -- Family name

Indicator 2: Type of added entry

- # -- No information provided (most common; co-authors, editors, etc.)
- 2 -- Analytical entry (The values for Indicator 2 changed in 1994 with Format Integration, and older records may display additional values. An analytical entry involves an author/title of an item contained in a work.)

Subfields used most often:

\$a -- Personal name
\$b -- Numeration
\$c -- Titles and other words associated with a name (R)
\$q -- Fuller form of name
\$d -- Dates associated with a name (generally, year of birth)
\$e -- Relator term (such as ill.) (R)
\$4 -- Relator code (R)

Example: 700 1# \$a Baldrige, Letitia.

710 Added entry -- Corporate name (R)

Indicator 1: Type of corporate name entry element

0 -- Inverted name (not used with AACR2)
 1 -- Jurisdiction name
 2 -- Name in direct order

Indicator 2: Type of added entry.

See Indicator 2 under 700

-- No information provided
 2 -- Analytical entry

Subfields used most often:

\$a -- Corporate name or jurisdiction name as entry element
\$b -- Subordinate unit (R)

Example: 710 2# \$a Sunburst Communications (Firm)

740 Added entry -- Uncontrolled related/analytical title (R)

Indicator 1: Nonfiling characters

0-9 -- Number of nonfiling characters present (for initial articles, including spaces)

Indicator 2: Type of added entry. See Indicator 2 under 700

-- No information provided
 2 -- Analytical entry

(This field was redefined in 1994 with Format Integration. Prior to 1994, the field was also used for variant titles, such as a different wording on a spine title. In records created since Format Integration, those variant titles appear in a 246 field.)

Subfield used most often:

\$a -- Title

Example: 740 02 \$a Uncle Vanya.

800 Series added entry -- Personal name (R)

Indicator 1: Type of personal name entry element

0 -- Forename

1 -- Surname

3 -- Family name

Indicator 2 undefined.

Subfields used most often:

\$a -- Personal name

\$b -- Numeration

\$c -- Titles and other words associated with a name (R)

\$q -- Fuller form of name

\$d -- Dates associated with a name (generally, year of birth)

\$t -- Title of a work (the series)

\$v -- Volume number

Example: 800 1# \$a Fisher, Leonard Everett.
 St Colonial American craftsmen.

830 Series added entry -- Uniform title (R)

Indicator 1 undefined.

Indicator 2: Nonfiling characters

0-9 -- Number of nonfiling characters present (for initial articles, including spaces)

Subfield used most often:

\$a -- Uniform title

\$v -- Volume number

Example: 830 #0 \$a Railroads of America (Macmillan)

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Part VIII:

A List of Other Fields Often Seen in MARC Records

001	Control number
003	Control number identifier
005	Date and time of latest transaction
006	Fixed-length data elements -- additional material characteristics
007	Physical description fixed field
008	Fixed length data elements (See Part X)
022	International Standard Serial Number (ISSN)
037	Source of acquisition
041	Language code
043	Geographic area code

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Exhibit 1011 – 08212/17

050	Library of Congress call number
060	National Library of Medicine call number
082	Dewey Decimal classification number (the one recommended by the Library of Congress; locally-assigned call numbers may appear elsewhere)
110	Main entry -- Corporate name (less frequent under AACR2 rules)
256	Computer file characteristics
263	Projected publication date (indicates a CIP -- Cataloging in Publication -- record)
306	Playing time
508	Creation/production credits note
510	Citation/references note (review sources)
511	Participant or performer note
521	Target audience note (first indicator: 0 = reading grade level, 1 = interest age level, 2 = interest grade level, 3 = special audience characteristics, 4 = motivation interest level)
530	Additional physical form available note
538	System details note
586	Awards note
656	Index term -- Occupation
730	Added entry -- Uniform title
852	Location
856	Electronic location and access
9XX	Reserved for local use. (They are used by vendors, systems, or individual libraries to exchange additional data)

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Part IX:

The Leader

There are 24 positions in the Leader, numbered from 00 to 23. For fuller explanation, see the *MARC 21 Format for Bibliographic Data*.

00-04	Record length (calculated by the computer for each record)
05	Record status
	a = increase in encoding level
	c = corrected or revised
	d = deleted
	n = new
	p = increase in encoding from prepublication (previous CIP)
06	Type of record
	a = language material
	c = printed music
	d = manuscript music
	e = cartographic material
	f = manuscript cartographic material
	g = projected medium
	i = nonmusical sound recording
	j = musical sound recording
	k = 2-dimensional nonprojectable graphic
	m = computer file
	o = kit

- p = mixed materials
- r = 3-dimensional artifact or naturally occurring object
- t = manuscript language material
- 07 **Bibliographic level**
 - a = monographic component part
 - b = serial component part
 - c = collection
 - d = subunit
 - i = integrating resource
 - m = monograph/item
 - s = serial
- 08 **Type of control**
 - # = no specified type
 - a = archival
- 09 **Character coding scheme**
 - # = MARC-8
 - a = UCS/Unicode
- 10 **Indicator count** (always "2")
- 11 **Subfield code count** (always "2")
- 12-16 **Base address of data** (calculated by the computer for each record)
- 17 **Encoding level**
 - # = full level
 - 1 = full level, material not examined
 - 2 = less-than-full level, material not examined
 - 3 = abbreviated level
 - 4 = core level
 - 5 = partial (preliminary) level
 - 7 = minimal level
 - 8 = prepublication level (CIP)
 - u = unknown
 - z = not applicable
- 18 **Descriptive cataloging form**
 - # = non-ISBD
 - a = AACR2
 - i = ISBD
 - u = unknown
- 19 **Multipart resource record level**
 - # = Not specified or not applicable
 - a = Set
 - b = Part with independent title
 - c = Part with dependent title
- 20 **Length of the length-of-field portion** (always "4")
- 21 **Length of the starting-character-position portion** (always "5")
- 22 **Length of the implementation-defined portion** (always "0")
- 23 **Undefined** (always "0")

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Part X:

Field 008 for Books

Field 008 is used for Fixed Length Data Elements ("Fixed Field Codes"). There are 40 character positions in field 008, numbered from 00-39. Undefined positions must contain either a blank (#) or a fill character (|). Positions 00-17 and 35-39 are defined the same way for all media.

The information shown here for positions 18-34 applies only to books. For explanation of all the positions below and for positions 18-34 for other media, see the *MARC 21 Format for Bibliographic Data*.

Note that field 008 has no indicators or subfield codes.

- 00-05 Date entered on file (YYMMDD),
 where Y=year, M=month, and D=day
- 06 Type of date/publication status:
 b = no dates given; B.C. date involved
 e = detailed date
 s = single known date/probable date
 m = multiple dates
 r = reprint/reissue date (Date 1) and original date (Date 2)
 n = dates unknown
 q = questionable date
 t = publication date and copyright date
 | = no attempt to code
- 07-10 Date 1/beginning date of publication
- 11-14 Date 2/ending date of publication

Date fields contain the year(s) of publication. The type of date(s) in these elements are specified in fixed field element 06: Type of date/publication status. (For further details, see the field 008 description in the *MARC 21 Format for Bibliographic Data*.)

- 15-17 Place of publication, production, or execution
 For example:
 pk# = Pakistan
 cau = California (US)

(For a full list of codes used in these positions, see the [MARC Code List for Countries](#).)

- 18-21 Illustrations (up to 4 codes):
 # = no illustrations
 a = illustrations
 b = maps
 c = portraits
 d = charts
 e = plans
 f = plates
 g = music
 h = facsimiles
 i = coats of arms
 j = genealogical tables
 k = forms
 l = samples
 m = phonodisc, phonowire, etc.
 o = photographs
 p = illuminations
 | = no attempt to code

- 22 **Target audience:**
 # = unknown or not specified
 a = preschool
 b = primary
 c = pre-adolescent
 d = adolescent
 e = adult
 f = specialized
 g = general
 j = juvenile
 | = no attempt to code
- 23 **Form of item:**
 # = none of the following
 a = microfilm
 b = microfiche
 c = microopaque
 d = large print
 f = braille
 r = regular print reproduction
 s = electronic
 | = no attempt to code
- 24-27 **Nature of contents (up to 4):**
 # = no specified nature of contents
 a = abstracts/summaries
 b = bibliographies (is one or contains one)
 c = catalogs
 d = dictionaries
 e = encyclopedias
 f = handbooks
 g = legal articles
 i = indexes
 j = patent document
 k = discographies
 l = legislation
 m = theses
 n = surveys of literature
 o = reviews
 p = programmed texts
 q = filmographies
 r = directories
 s = statistics
 t = technical reports
 u = standards/specifications
 v = legal cases and notes
 w = law reports and digests
 z = treaties
 | = no attempt to code
- 28 **Government publication:**
 # = not a government publication
 i = international intergovernmental
 f = federal/national
 a = autonomous or semi-autonomous component
 s = state, provincial, territorial, dependent, etc.
 m = multistate

- c = multilocal
- l = local
- z = other type of government publication
- o = government publication -- level undetermined
- u = unknown if item is government publication
- | = no attempt to code
- 29 **Conference publication:**
 - 0 = not a conference publication
 - 1 = conference publication
 - | = no attempt to code
- 30 **Festschrift:**
 - 0 = not a festschrift
 - 1 = festschrift
 - | = no attempt to code
- 31 **Index:**
 - 0 = no index
 - 1 = index present
 - | = no attempt to code
- 32 **Undefined (since 1990)** (Earlier records may contain the values 0 or 1)
 - # = Undefined
 - | = no attempt to code
- 33 **Literary form:**
 - 0 = not fiction (not further specified)
 - 1 = fiction (not further specified)
 - c = comic strips
 - d = dramas
 - e = essays
 - f = novels
 - h = humor, satires, etc.
 - i = letters
 - j = short stories
 - m = mixed forms
 - p = poetry
 - s = speeches
 - u = unknown
 - | = no attempt to code
- 34 **Biography:**
 - # = no biographical material
 - a = autobiography
 - b = individual biography
 - c = collective biography
 - d = contains biographical information
 - | = no attempt to code
- 35-37 **Language:**

A three-letter code. For example: eng fre ger spa rus ita

(For a full list of codes used in these positions, see the [MARC Code List for Languages](#).)

- 38 **Modified record:**
 - # = not modified
 - x = missing characters (because of characters unavailable in MARC character set)
 - s = shortened
 - d = "dashed-on" information omitted

- r = completely romanized/printed cards in script
- o = completely romanized/printed cards romanized
- | = no attempt to code

39

Cataloging source:

- # = national bibliographic agency
- c = cooperative cataloging program
- d = other sources
- u = unknown
- | = no attempt to code

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[\[Back to Table of Contents \]](#) -- [\[Continue to Part 11 \]](#)**Library of Congress**[*Library of Congress Help Desk*](#) (10/27/2009)

Appendix B

Search RFCs

[Advanced Search](#)

RFC Editor

RFC 760

DoD standard Internet Protocol, JANUARY 1980

File formats:



Status:

UNKNOWN

Obsoletes:

IEN 123

Obsoleted by:

RFC 791

Updated by:

RFC 777

Author:

J. Postel

Stream:

[Legacy]

Cite this RFC: TXT | XML

DOI: 10.17487/RFC0760

Discuss this RFC: Send questions or comments to iesg@ietf.org or ietf@zoho.com. Zoho Corp. and Zoho Corp. Pvt., Ltd.

Other actions: [Submit Errata](#) | [Find IPR Disclosures from the IETF](#) | [View History of RFC 760](#)

For the definition of **Status**, see RFC 2026.

For the definition of **Stream**, see RFC 8729.

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Appendix C

Search RFCs

[Advanced Search](#)

RFC Editor

STD 5

RFC 791

Internet Protocol, SEPTEMBER 1981

File formats:



Status:

INTERNET STANDARD

Obsoletes:

RFC 760

Updated by:

RFC 1349, RFC 2474, RFC 6864

Author:

J. Postel

Stream:

[Legacy]

Cite this RFC: TXT | XML

Zoho Corp. and Zoho Corp. Pvt., Ltd.
Exhibit 1011 – 093^{1/2}

DOI: 10.17487/RFC0791

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For the definition of **Status**, see RFC 2026.

For the definition of **Stream**, see RFC 8729.

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Appendix D

Search RFCs

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RFC Editor

STD 5

RFC 1112

Host extensions for IP multicasting, AUGUST 1989

File formats:



Status:

INTERNET STANDARD

Obsoletes:

RFC 988, RFC 1054

Updated by:

RFC 2236

Author:

S.E. Deering

Stream:

[Legacy]

Cite this RFC: TXT | XML

Zoho Corp. and Zoho Corp. Pvt., Ltd.
Exhibit 1011 – 096^{1/2}

DOI: 10.17487/RFC1112

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Abstract

This memo specifies the extensions required of a host implementation of the Internet Protocol (IP) to support multicasting. Recommended procedure for IP multicasting in the Internet. This RFC obsoletes RFCs 998 and 1054. [STANDARDS-TRACK]

For the definition of **Status**, see RFC 2026.

For the definition of **Stream**, see RFC 8729.

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Appendix E

Search RFCs

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RFC Editor

RFC 2401

Security Architecture for the Internet Protocol,
NOVEMBER 1998

File formats:**Status:**

PROPOSED STANDARD

Obsoletes:

RFC 1825

Obsoleted by:

RFC 4301

Updated by:

RFC 3168

Authors:

S. Kent

R. Atkinson

Stream:

IETF

Source:

ipsec (sec)

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Exhibit 1011 – 099^{1/2}

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Abstract

This memo specifies the base architecture for IPsec compliant systems.
[STANDARDS-TRACK]

For the definition of **Status**, see RFC 2026.

For the definition of **Stream**, see RFC 8729.

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Appendix F

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RFC Editor

RFC 2406

IP Encapsulating Security Payload (ESP), NOVEMBER
1998

File formats:



Status:

PROPOSED STANDARD

Obsoletes:

RFC 1827

Obsoleted by:

RFC 4303, RFC 4305

Authors:

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Stream:

IETF

Source:

ipsec (sec)

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Abstract

The Encapsulating Security Payload (ESP) header is designed to provide a mix of security services in IPv4 and IPv6. [STANDARDS-TRACK]

For the definition of **Status**, see RFC 2026.

For the definition of **Stream**, see RFC 8729.

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Appendix G



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A Primer on the T.120 Series Standard

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Introduction

The T.120 standard contains a series of communication and application protocols and services that provide support for real-time, multipoint data communications. These multipoint facilities are important building blocks for a whole new range of collaborative applications, including desktop data conferencing, multi-user applications, and multi-player gaming.

Broad in scope, T.120 is a comprehensive specification that solves several problems that have historically slowed market growth for applications of this nature. Perhaps most importantly, T.120 resolves complex technological issues in a manner that is acceptable to both the computing and telecommunications industries.

Established by the International Telecommunications Union (ITU), T.120 is a family of open standards that was defined by leading data communication practitioners in the industry. Over 100 key international vendors, including Apple, AT&T, British Telecom, Cisco Systems, Intel, MCI, Microsoft, and PictureTel, have committed to implementing T.120-based products and services.

While T.120 has emerged as a critical element in the data communications landscape, the only information that currently exists on the topic is a weighty and complicated set of standards documents. This primer bridges this information gap by summarizing T.120's major benefits, fundamental architectural elements, and core capabilities.

Key Benefits of T.120

So why all the excitement about T.120? The bottom line is that it provides exceptional benefits to end users, vendors, and developers tasked with implementing real-time applications. The following list is a high-level overview of the major benefits associated with the T.120 standard:

Multipoint Data Delivery

T.120 provides an elegant abstraction for developers to create and manage a multipoint domain with ease. From an application perspective, data is seamlessly delivered to multiple parties in "realtime."



Ad by **CRITEO**[Report this ad](#)[Ad choices](#)**Interoperability**

T.120 allows endpoint applications from multiple vendors to interoperate. T.120 also specifies how applications may interoperate with (or through) a variety of network bridging products and services that also support the T.120 standard.

Reliable Data Delivery

Error-corrected data delivery ensures that all endpoints will receive each data transmission.

Multicast Enabled Delivery

In multicast enabled networks, T.120 can employ reliable (ordered, guaranteed) and unreliable delivery services. Unreliable data delivery is also available without multicast. By using multicast, the T.120 infrastructure reduces network congestion and improves performance for the end user. The T.120 infrastructure can use both unicast and multicast simultaneously, providing a flexible solution for mixed unicast and multicast networks. The Multicast Adaptation Protocol (MAP) is expected to be ratified in early 1998.

Network Transparency

Applications are completely shielded from the underlying data transport mechanism being used. Whether the transport is a high-speed LAN or a simple dial-up modem, the application developer is only concerned with a single, consistent set of application services.

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Because the T.120 standard is completely free from any platform dependencies, it will readily take advantage of the inevitable advances in computing technology. In fact, DataBeam's customers have already ported the T.120 source code easily from Windows to a variety of environments, including OS/2, MAC/OS, several versions of UNIX, and other proprietary real-time operating systems.

Network Independence

The T.120 standard supports a broad range of transport options, including the Public Switched Telephone Networks (PSTN or POTS), Integrated Switched Digital Networks (ISDN), Packet Switched Digital Networks (PSDN), Circuit Switched Digital Networks (CSDN), and Zoho Corp. and Zoho Corp. Pvt., Ltd.

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Multipoint Control Unit (MCU) will be common early on. The standard also supports a wide variety of other topologies ranging from those with multiple, cascaded MCUs to topologies as simple as a daisy-chain. In complex multipoint conferences, topology may have a significant impact on efficiency and performance.

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Application Independence

Although the driving market force behind T.120 was teleconferencing, its designers purposely sought to satisfy a much broader range of application needs. Today, T.120 provides a generic, real-time communications facility that can be used by many different applications. These applications include interactive gaming, virtual reality and simulations, real-time subscription news feeds, and process control applications.

Scalability

T.120 is defined to be easily scalable from simple PC-based architectures to complex multi-processor environments characterized by their high performance. Resources for T.120 applications are plentiful, with practical limits imposed only by the confines of the specific platform running the software.

Co-existence with Other Standards

T.120 was designed to work alone or within the larger context of other ITU standards, such as the H.32x family of video conferencing standards. T.120 also supports and cross-references other important ITU standards, such as V.series modems.

Extendability

The T.120 standard can be freely extended to include a variety of new capabilities, such as support for new transport stacks (like ATM or Frame Relay), improved security measures, and new application-level protocols.

Architectural Overview

The T.120 architecture relies on a multi-layered approach with defined protocols and service definitions between layers. Each layer presumes that all layers exist below. Figure 1 provides a graphical representation of the T.120 architecture.



Figure 1

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Component Overview

The following overview describes the key characteristics and concepts behind each individual component of the T.120 standard. This overview starts at the bottom of the T.120 stack and progresses upward.

Transport Stacks - T.123

T.120 applications expect the underlying transport to provide reliable delivery of its Protocol Data Units (PDUs) and to segment and sequence that data. T.123 specifies transport profiles for each of the following:

- Public Switched Telephone Networks (PSTN)
- Integrated Switched Digital Networks (ISDN)
- Circuit Switched Digital Networks (CSDN)
- Packet Switched Digital Networks (PSDN)
- TCP/IP
- Novell Netware IPX (via reference profile)

As highlighted below in Figure 2, the T.123 layer presents a uniform OSI transport interface and services (X.214/X.224) to the MCS layer above. The T.123 layer includes built-in error correction facilities so application developers do not have to rely on special hardware facilities to perform this function.



Figure 2

In a given computing environment, a transport stack typically plugs into a local facility that provides an interface to the specific transport connection. For example, in the Windows environment, DataBeam's transport stacks plug into COMM.DRV for modem communications, WINSOCK.DLL for TCP/IP and UDP/IP communications, and NWIPXSPX. DLL for Novell IPX communications support.

The Multicast Adaptation Protocol (MAP) service layer is a new extension to MCS. MAP manages unicast- and multicast-based transports. MAP can be used with any transport where multicast is available, such as IP networks. While multicast provides unreliable delivery, many applications using T.120 require reliable services. Developers can incorporate a variety of multicast error correction schemes into MAP, thereby selecting the scheme most closely aligned with their application.

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In 1996, the ITU is expected to adopt extensions to support important new transport facilities, such as Asynchronous Transfer Mode (ATM) and H.324 POTS videophone. It is necessary to note that developers can easily produce a proprietary transport stack (supporting, for example, AppleTalk) that transparently uses the services above T.123. An important function of MCUs or T.120-enabled bridges, routers, or gateways is to provide transparent interworking across different network boundaries.

Multipoint Communication Service (MCS) - T.122, T.125

T.122 defines the multipoint services available to the developer, while T.125 specifies the data transmission protocol. Together they form MCS, the multipoint "engine" of the T.120 conference. MCS relies on T.123 to deliver the data. (Use of MCS is entirely independent of the actual T.123 transport stack(s) that is loaded.)

MCS is a powerful tool that can be used to solve virtually any multipoint application design requirement. MCS is an elegant abstraction of a complex organism. Learning to use MCS effectively is the key to successfully developing real-time applications.

How MCS Works

In a conference, multiple endpoints (or MCS nodes) are logically connected together to form what T.120 refers to as a domain. Domains generally equate to the concept of a conference. An application may actually be attached to multiple domains simultaneously. For example, the chairperson of a large online conference may simultaneously monitor information being discussed among several activity groups.

In a T.120 conference, nodes connect up-ward to a Multipoint Control Unit (MCU). The MCU model in T.120 provides a reliable approach that works in both public and private networks. Multiple MCUs may be easily chained together in a single domain. Figure 3 illustrates three potential topology structures. Each domain has a single Top Provider or MCU that houses the information base critical to the conference. If the Top Provider either fails or leaves a conference, the conference is terminated. If a lower level MCU (i.e., not the Top Provider) fails, only the nodes on the tree below that MCU are dropped from the conference. Because all nodes contain MCS, they are all potentially "MCUs."

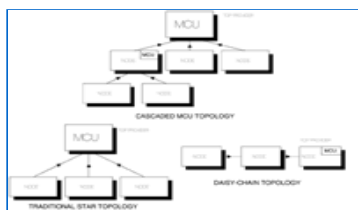


Figure 3

One of the critical features of the T.120 approach is the ability to direct data. This feature allows applications to communicate efficiently. MCS applications direct data within a domain via the use of channels. An application can choose to use multiple channels simultaneously for whatever purposes it needs (for example, separating annotation and file transfer operations). Application instances choose to obtain information by subscribing to whichever channel(s)

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Figure 4

It is the application developer's responsibility to determine how to use channels within an application. For example, an application may send control information along a single channel and application data along a series of channels that may vary depending upon the type of data being sent. The application developer may also take advantage of the MCS concept of private channels to direct data to a discrete subset of a given conference.

Data may be sent with one of four priority levels. MCS applications may also specify that data is routed along the quickest path of delivery using the standard send command. If the application uses the uniform send command, it ensures that data from multiple senders will arrive at all destinations in the same order. Uniform data always travels all the way up the tree to the Top Provider. Table 1 provides an example of how a document conferencing application could set up its channels. Reliable or unreliable data delivery is determined by the application.

Table 1

Channel	Type	Priority	Routing
1	Error Control Channels	Top	Standard
2	Annotations	High	Uniform
3	Bitmap Images	Medium	Uniform
4	File Transfer	Low	Standard

There are no constraints on the size of the data sent from an application to MCS. Segmentation of data is automatically per-formed on behalf of the application. However, after receiving the data it is the application's responsibility to reassemble the data by monitoring flags provided when the data is delivered.

Tokens are the last major facility provided by MCS. Services are provided to grab, pass, inhibit, release, and query tokens. Token resources may be used as either exclusive (i.e., locking) or non-exclusive entities.

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Tokens can be used by an application in a number of ways. For example, an application may specify that only the holder of a specific token, such as the conductor, may send information in the conference.

Another popular use of tokens is to coordinate tasks within a domain. For example, suppose a teacher wants to be sure that every student in a distance learning session answered a particular question before displaying the answer. Each node in the underlying application inhibits a specific token after receiving the request to answer the question. The

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Generic Conference Control provides a comprehensive set of facilities for establishing and managing the multipoint conference. It is with GCC that we first see features that are specific to the electronic conference.

At the heart of GCC is an important information base about the state of the various conferences it may be servicing. One node, which may be the MCU itself, serves as the Top Provider for GCC information. Any actions or requests from lower GCC nodes ultimately filter up to this Top Provider.

Using mechanisms in GCC, applications create conferences, join conferences, and invite others to conferences. As endpoints join and leave conferences, the information base in GCC is updated and can be used to automatically notify all endpoints when these actions occur. GCC also knows who is the Top Provider for the conference. However, GCC does not contain detailed topology information about the means by which nodes from lower branches are connected to the conference.

Every application in a conference must register its unique application key with GCC. This enables any subsequent joining nodes to find compatible applications. Furthermore, GCC provides robust facilities for applications to exchange capabilities and arbitrate feature sets. In this way, applications from different vendors can readily establish whether or not they can interoperate and at what feature level. This arbitration facility is the mechanism used to ensure backward compatibility between different versions of the same application.

GCC also provides conference security. This allows applications to incorporate password protection or "lock" facilities to prevent uninvited users from joining a conference.

Another key function of GCC is its ability to dynamically track MCS resources. Since multiple applications can use MCS at the same time, applications rely on GCC to prevent conflicts for MCS resources, such as channels and tokens. This ensures that applications do not step on each other by attaching to the same channel or requesting a token already in use by another application.

Finally, GCC provides capabilities for supporting the concept of conductorship in a conference. GCC allows the application to identify the conductor and a means in which to transfer the conductor's "baton." The developer is free to decide how to use these conductorship facilities within the application.

T.124 Revised

As part of the ongoing enhancement process for the T.120 standards, the ITU has completed a draft revision of T.124. The new version, called T.124 Revised, introduces a number of changes to improve scalability. The most significant changes address the need to distribute roster information to all nodes participating in a conference, as well as improvements in the efficiency of sending roster refresh information (from the Top Provider) any time a node joins or leaves a conference.

To improve the distribution of roster information, the concept of Node Categories was introduced. These categories provide a way for a T.124 node to join or leave a conference without affecting the roster information that was distributed throughout a conference. In addition, the Full Roster Refresh, which was previously sent any time a new node joined a conference, was eliminated by sending out roster details from the Top Provider. These changes will not affect backward compatibility to earlier revisions of T.124. This revision will go to the ITU for Decision in March of 1998.

Generic Application Template (GAT) - T.121

T.121 provides a template for T.120 resource management that developers should use as a guide for building application protocols. T.121 is mandatory for standardized application protocols and is highly recommended for non-standard application protocols. The template ensures consistency and reduces the potential for unforeseen interaction between different protocol implementations.



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Figure 5

GAT's functionality is considered to be generic and common to all application protocols. GAT's services include enrolling the application in GCC and attaching to MCS domains. GAT also manages channels, tokens, and capabilities on behalf of the application. On a broader scale, GAT responds to GCC indications and can invoke peer applications on other nodes in the conference.

Still Image Exchange and Annotation (SI) - T.126

T.126 defines a protocol for viewing and annotating still images transmitted between two or more applications. This capability is often referred to as document conferencing or *shared whiteboarding*.

An important benefit of T.126 is that it readily shares visual information between applications that are running on dramatically different platforms. For example, a Windows-based desktop application could easily interoperate with a collaboration program running on a PowerMac. Similarly, a group-oriented conferencing system, without a PC-style interface, could share data with multiple users running common PC desktop software.

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As Figure 6 illustrates, T.126 presents the concept of shared virtual workspaces that are manipulated by the endpoint applications. Each workspace may contain a collection of objects that include bitmap images and annotation primitives, such as rectangles and freehand lines. Bitmaps typically originate from application information, such as a word processing document or a presentation slide. Because of their size, bitmaps are often compressed to improve performance over lower-speed communication links.

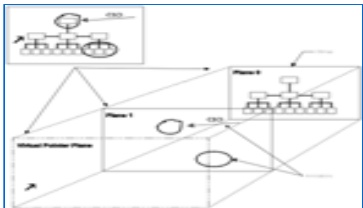


Figure 6

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Multipoint Binary File Transfer - 1.12/

T.127 specifies a means for applications to transmit files between multiple endpoints in a conference. Files can be transferred to all participants in the conference or to a specified subset of the conference. Multiple file transfer operations may occur simultaneously in any given conference and developers can specify priority levels for the file delivery. Finally, T.127 provides options for compressing files before delivering the data. Figure 7 displays a view of conference-wide and individual file transfers.

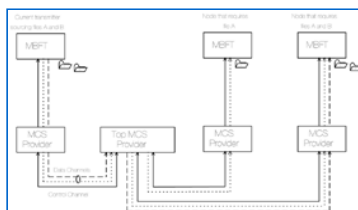


Figure 7

Node Controller

The Node Controller manages defined GCC Service Access Points (SAPs). This provides the node flexibility in responding to GCC events. Most of these GCC events relate to establishing conferences, adding or removing nodes from a conference, and breaking down and distributing information. The Node Controller's primary responsibility is to translate these events and respond appropriately.

Some GCC events can be handled automatically; for example, when a remote party joins a conference, each local Node Controller can post a simple message informing the local user that "Bill Smith has joined the conference." Other events may require user intervention; for example, when a remote party issues an invitation to join a conference, the local Node Controller posts a dialog box stating that "Mary Jones has invited you to the Design Review conference. <Accept> <Decline>."

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Node controllers can be MCU-based, terminal-based, or dual-purpose. DataBeam's application, FarSite, for example, contains a dual-purpose Node Controller. The range of functionality found within a Node Controller can vary dramatically by implementation.

Only one Node Controller can exist on an active T.120 endpoint. Therefore, if multiple applications need to simultaneously use T.120 services, the Node Controller needs to be accessible to each application. The local interface to the Node Controller is application- and vendor-specific and is not detailed in the T.120 documentation.

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interoperability.

Network-level Interoperability

Network-level interoperability means that a given product can interwork with like products through the infrastructure of network products and services that support T.120. For example, T.120-based conferencing bridges (MCUs) that can support hundreds of simultaneous users are now being developed. If an application supports only the lower layers of T.120, customers can use these MCUs to host a multipoint conference only if everyone in the conference is using the exact same product. Figure 8 displays network interoperability through a conference of like products.

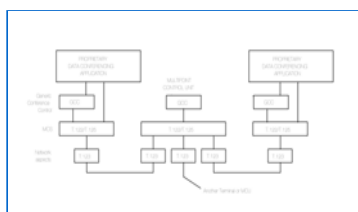


Figure 8

Application-level Interoperability

The upper levels of T.120 specify protocols for common conferencing applications, such as shared whiteboarding and binary file transfer. Applications supporting these protocols can interoperate with any other application that provides similar support, regardless of the vendor or platform used. For example, through T.126, users of DataBeam's FarSite application will be able to share and mark up documents with users of group conferencing systems. This interoperability will exist in simple point-to-point conferences as well as large multipoint conferences using a conference bridge. Figure 9 represents application-level interoperability between two standards-based applications connected in a conference.

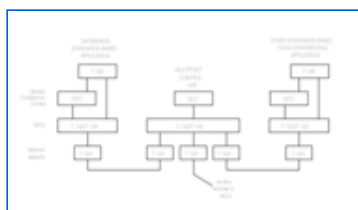


Figure 9

In the short-term, network-level interoperability will be the most common form of T.120 support found in conferencing applications. This is largely due to the fact that the lower-level T.120 layers were ratified by the ITU more than a year in advance of the application-level layers. However, end users will not be satisfied with network interoperability alone. For the market to grow, vendors will have to deliver the same application-level interoperability (or endpoint interoperability) that customers enjoy today with fax machines and telephones.

Ratification of the T.120 and Future T.130 Standards

The Recommendations for the core multipoint communications infrastructure components (T.122, T.123, T.124 and T.125) were ratified by the ITU between March of 1993 and March of 1995. The first of the application standards (T.126 and T.127) was approved in March of 1995. An overview of the T.120 series was approved in February of 1996 as Recommendation T.120. T.121 (GAT) was also approved at that time. Stable drafts of these recommendations existed for some time prior to the ratification, thereby providing a means for DataBeam to actively develop products in parallel to the standardization effort.

The existing ratified standards are being actively discussed for possible amendments and extensions. This commonly occurs when implementation and interoperability issues arise.

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Conference Server, to provide I.132 audio and video services to their endpoints. Some of the services include Stream Identification, On-Air Identification, Video Switching, Audio Mixing, Remote Device Control, and Continuous Presence.

The T.130 series is built upon existing ITU-T conferencing recommendations such as the H.320 audio-visual conferencing series and the T.120 series for multipoint data conferencing. The T.130 series is compatible with systems, such as H.323, in which audio and video are transmitted independently of T.120, as well as systems which are capable of transmitting multiple media types within a common multiplex.

Unlike other standardized methods for managing real-time streams within a conference, T.130 provides some unique capabilities:

- Contains a network- and platform-independent control protocol for managing real-time streams
- Coordinates operations across network boundaries
- Processes and distributes media streams within a conference environment
- Delivers of Quality of Service (QoS) to multimediacomunications applications
- Provides distributed conference management
- Leverages the functionality of existing multimedia protocols

T.130 can be used in any conferencing scenario where there is a need for multipoint audio or video. T.130 relies upon the services of GCC and MCS to transmit control data, but the audio and video streams are transported in independent logical channels due to the transmission requirements of real-time data flows. (See Figure 10).

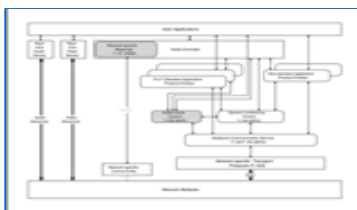


Figure 10

T.130 and T.132 were determined in March of 1997 and should be ratified in January of 1998. T.131, which defines network-specific mappings to allow AVC to communicate with the underlying Multimedia Control Protocol, such as H.245, should be determined in the Fall of 1997.

Vendor Community Support for T.120

More than 100 multi-national companies have pledged their support for the T.120 standard and more are being added to this list every week. Public supporters of T.120 include international market leaders such as [Apple](#), [AT&T](#), [British Telecom](#), [Cisco Systems](#), Deutsche Telecom, [IBM](#), [Intel](#), [MCI](#), [Microsoft](#), [Motorola](#), [PictureTel](#), and [DataBeam](#).

Most supporters of T.120 are also members of the [International Multimedia Teleconferencing Consortium \(IMTC\)](#)>. The goals of the IMTC are to promote the awareness and adoption of ITU teleconferencing standards, including T.120 and H.32x. The IMTC provides a forum for interoperability testing and helps to define Application Programming Interfaces (APIs). DataBeam's co-founder and chief technical officer, C. J. "Neil" Starkey, serves as the president of the IMTC. Previously, Starkey served for six years as chairman of the ITU study group that defined T.120.

New Markets for T.120 Deployment

The teleconferencing community is the first market segment to adopt the T.120 standard. Because the technology is broad in scope, it can be effectively used by a number of other application software vendors and equipment providers.

The computing paradigm is rapidly extending past today's personal productivity model. Over the next two years, we will witness the development of a new generation of application software that incorporates multi-party collaboration. Independent Software Vendors (ISVs) have begun to adopt T.120 as the [Zoho Corp. and Zoho Corp. Private Ltd.](#) [Zoho Corp. and Zoho Corp. Private Ltd.](#)

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Equipment providers are beginning to take notice. For vendors of PBXs, network bridges, hubs, routers and switches, T.120 represents an important opportunity to provide value-added capabilities within their network products. In the short-term, these features will represent an opportunity for competitive advantage. However, within the next year, T.120 support will be a required feature.

Finally, we can envision a whole range of T.120 applications in the areas of interactive video, network gaming, and simulations. From Nintendo to DOOM to set-top boxes, the need for bidirectional multipoint data communications is acute. The ability to use a common set of APIs and protocols that are broadly supported from the desktop through the network will drive the adoption of T.120 into these important emerging markets.

IMTC, ITU, and T.120

Standards have played an important part in the establishment and growth of several consumer and telecommunications markets. By creating a basic commonality, standards ensure compatibility among products from different manufacturers. This encourages companies to produce varying solutions and encourages end users to purchase the solutions without fear of obsolescence or incompatibility.

The work of both the IMTC and the ITU represents organized efforts to promote a basic connectivity protocol that will encourage the growth of the multimedia telecommunications market. The Standards FirstTM initiative, which is supported by many industry leaders, requires a minimum of H.320 and T.120 compliance, which is enough to establish this basic connectivity protocol. Manufacturers are then able to build on the basic compliance by adding features to their products, creating Standards Plus equipment.

With Standards First, the IMTC has the end users' interests in mind. By ensuring interoperability among equipment from competing manufacturers, Standards First also ensures that a customer's initial investment is protected and future system upgrades are possible. The IMTC is helping to educate the industry and the public about the importance, function, and status of standards. In addition, the organization provides a coordination point for industry leaders to communicate their interests to the ITU-T. As the multipoint multimedia teleconferencing industry continues its rapid growth, the development and implementation of standards for interoperability, and the work of the IMTC, will be instrumental in securing the market's future.

Implementing T.120

With the T.120 set of standards in place, third-party developers are faced with yet another challenge- implementation. DataBeam's Collaborative Computing Toolkit Series (CCTSTM) has jump-started the conferencing industry by providing the first standards-based toolkits for developing multipoint, data-sharing applications. These toolkits encapsulate the complex system-wide, multipoint communications stacks that allow application developers to rapidly embed sophisticated real-time, data-sharing capabilities into new or existing products. Simply stated, CCTS provides a seamless solution for parties developing standards-based communication solutions.

As a result, DataBeam envisions an acceleration in the development of software applications and network infrastructure products such as, PBXs, bridges, routers, network switches, and LAN servers, that incorporate T.120. In addition, the industry will grow well beyond today's existing paradigms and the world will begin to see a whole range of new products and services that incorporate T.120. Users waiting for the standards dust to settle can now feel confident that with the support of vendors like Microsoft, DataBeam's T.120-based Collaborative Computing Toolkit Series is the best solution for industry-wide interoperability.

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Appendix H



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ITU-T Recommendations



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Provisional name

ISO/IEC number

Formal description

Study Groups tree view

ITU-T T.120 (07/1996)

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Data protocols for multimedia conferencing

PDF

The T.120-Series of Recommendations collectively define a multipoint data communication service for use in multimedia conferencing environments. The purpose of this Recommendation is to provide an introduction and guide to the T.120-Series. This Recommendation defines the T.120 architectural model and shows the interrelationships between the constituent Recommendations. Each Recommendation in the Series is outlined and the requirements for T.120 compliance are specified.

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Approval date:	1996-07-03
Provisional name:	T.LITE
Approval process:	TAP
Status:	Superseded
Maintenance responsibility:	ITU-T Study Group 16
Further details:	Patent statement(s)

Editions Related Supplement(s)

Ed.	ITU-T Recommendation	Status	Summary	Table of Contents	Download
2	T.120 (01/2007)	In force	here	here	here

	1.1	T.120 Annex C (02/1998)	Superseded	here	here	here
	1	T.120 (07/1996)	Superseded	here	here	here

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955 __ |a pc14 to ja00 08-02-99; jf09 to subj 8-2-99; jf08 08-03-99 back to CIP for more info.; pc20 ret. to jf09 11-04-99; jf08 11-09-99 to SL; jf12 to Dewey 11-09-99; aa07 11-09-99; CIP ver. jp02 05-03-00 to SL; jf25 to BCCD 05-10-00; copy 2 added; jg22 07-26-00; to BCCD 07-26-00
010 __ |a 99040271
020 __ |a 0071347771
040 __ |a DLC |c DLC |d DLC
042 __ |a pcc
050 00 |a TK5105.8865 |b .C37 2000
082 00 |a 004.6 |2 21
100 1_ |a Caputo, Robert.
245 10 |a Cisco packetized voice and data integration / |c Robert Caputo.
260 __ |a New York : |b McGraw-Hill, |c c2000.
300 __ |a xxi, 334 p. : |b ill. ; |c 24 cm.
490 1_ |a McGraw-Hill technical expert series
650 _0 |a Internet telephony.
650 _0 |a Packet switching (Data transmission)
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Appendix J

BOOK

Cisco packetized voice and data integration

Full Record MARC Tags

Personal name

Caputo, Robert.

Main title

Cisco packetized voice and data integration / Robert Caputo.

Published/Created

New York : McGraw-Hill, c2000.

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LCCN Permalink <https://lccn.loc.gov/99040271>

Description xxi, 334 p. : ill. ; 24 cm.

ISBN 0071347771

LC classification TK5105.8865 .C37 2000

LC Subjects [Internet telephony.](#)
[Packet switching \(Data transmission\)](#)
[Data integration \(Computer science\)](#)

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LC Catalog - Item Information (Full Record)

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Series	McGraw-Hill technical expert series Cisco technical expert.
LCCN	99040271
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Appendix K

Copyright

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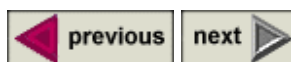
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Copyright Catalog (1978 to present)

Search Request: Left Anchored Title = Cisco Packetized

Search Results: Displaying 2 of 2 entries

[Labeled View](#)*Cisco packetized voice and data integration / Robert Caputo.***Type of Work:** Text**Registration Number / Date:** TX0005065787 / 1999-10-07**Title:** Cisco packetized voice and data integration / Robert Caputo.**Imprint:** New York : McGraw-Hill, c2000.**Description:** 334 p.**Series:** McGraw-Hill technical expert series**Copyright Claimant:** McGraw-Hill Companies, Inc.**Date of Creation:** 1999**Date of Publication:** 1999-08-29**Previous Registration:** Appl. states entire text new except foreword from another source.**Names:** [Caputo, Robert](#)[McGraw-Hill Companies, Inc.](#)**Save, Print and Email ([Help Page](#))**Select Download Format Enter your email address: [Help](#) [Search](#) [History](#) [Titles](#) [Start Over](#)[Contact Us](#) | [Request Copies](#) | [Get a Search Estimate](#) | [Frequently Asked Questions \(FAQs\) about Copyright](#) | [Copyright Office Home Page](#) | [Library of Congress Home Page](#)

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[Ask Us!](#)[Other Catalogs](#)[Help](#)**Full Record****Permalink for this record:** <http://library.mit.edu/item/000282028>[Results List](#) | [Add to Bookshelf](#) | [Save/Email](#)Choose format: [Standard](#) | [Citation](#) | [MARC tags](#)**Record 1 out of 1****Author** [IEEE Communications Society.](#)**Title** IEEE communications magazine.**Continues** IEEE Communications Society magazine**Online Access**  v.17 (1979)-

Library Holdings Barker Library - Microforms | No Call # | FICHE
v.17:no.1 (1979:Jan.)-v.28 (2000)
Library Storage Annex - Off Campus Collection | TK.I22.C7343
v.17 (1979)-v.48:no.1-6 (2010) incomplete

Shelf Access [Find it in the library/Request item](#)**Shelf Location** [Barker Library - Microforms | FICHE No Call #](#)**Shelf Location** [Library Storage Annex - Off Campus Collection | TK.I22.C7343](#)**Published** [New York, Communications Society of Institute of Electrical and Electronics Engineers]**Description** v. ill. 28 cm.**Numbering** v. 17- Jan. 1979-**Current Frequency** Monthly <, Aug. 1983- >**Former Frequency** Bimonthly**Format** Serial (e.g. journals, book series, etc.)**Other Format** Also available by subscription via the World Wide Web.**Subject** [Telecommunication -- Periodicals.](#)**Title Abbreviation** IEEE commun. mag.**Other Title** Institute of Electrical and Electronics Engineers communications magazine.**ISSN** 0163-6804**CODEN** ICOMD9**Local System Number** **000282028**

Basic Search of Full Catalog

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OCLC : (OCoLC)04447692

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Appendix M

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300 |a v. |b ill. |c 28 cm.
310 |a Monthly |b <, Aug. 1983- >
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5101 |a Index to IEEE publications |x 0099-1368

5102 |a International aerospace abstracts |x 0020-5842
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5102 |a Electrical & electronics abstracts |x 0036-8105 |b Jan. 1979-
5102 |a Physics abstracts. Science abstracts. Series A |x 0036-8091 |b Jan. 1979-
5102 |a Predicasts
5102 |a ELectronic publishing abstracts |x 0739-2907
5101 |a Applied science & technology index |x 0003-6986
530 |a Also available by subscription via the World Wide Web.
650 0 |a Telecommunication |v Periodicals.
78000 |t IEEE Communications Society magazine |x 0148-9615 |w (DLC) 78645258 |w (OCoLC)3160000
793 |a IEEE communications magazine. vol.30,no.3 1992 |g 9400005787 940005756
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004 000282028
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LU564 |u <http://ieeexplore.ieee.org/servlet/opac?punumber=35> |f 001
SMHL |b Internet Resource |c Electronic Journal |h **See URL(s) |a v.17 (1979)- |9 001
SYS 000282028

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Appendix N



JOURNAL

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IEEE Communications Society.

1979

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v.23 (1985)



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Details

Title	IEEE communications magazine.
Creator	IEEE Communications Society. >
Subject	Telecommunication >
Genre	Periodicals.
Other title	Institute of Electrical and Electronics Engineers communications magazine
Related titles	Earlier title : IEEE Communications Society magazine > Later title : IEEE communications magazine. >
Publisher	New York, Communications Society of Institute of Electrical and Electronics Engineers v. 17- Jan. 1979-
Creation Date	1979
Format	v. ill. 28 cm.
Frequency	Monthly <, Aug. 1983- >
Source	Library Catalog
Identifier	LC : 80644037 ISSN : 0163-6804 OCLC : (OCoLC)04447692

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Appendix O

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001	12555053
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020	___ a 0072193069
040	___ a DLC c DLC d DLC
050	00 a QA76.15 b .F732 2001
082	00 a 004/.03 2 21
100	1_ a Freedman, Alan, d 1942-
245	10 a Computer desktop encyclopedia / c Alan Freedman.
250	___ a 9th ed.
260	___ a New York : b Osborne/McGraw-Hill, c c2001.
300	___ a viii, 1124 p. : b ill. ; c 24 cm. + e 1 computer optical disc (4 3/4 in.)
538	___ a System requirements for accompanying computer disc: Windows.
650	_0 a Computers x Dictionaries.
856	42 3 Publisher description u http://www.loc.gov/catdir/description/mh031/2001278111.html

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Appendix P

BOOK

Computer desktop encyclopedia

Full Record

MARC Tags

Personal name

Freedman, Alan, 1942-

Main title

Computer desktop encyclopedia / Alan Freedman.

Edition

9th ed.

Published/Created

New York : Osborne/McGraw-Hill, c2001.

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Description

viii, 1124 p. : ill. ; 24 cm. + 1 computer optical disc (4 3/4 in.)

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1/2

ISBN	0072193069
LC classification	QA76.15 .F732 2001
LC Subjects	Computers--Dictionaries.
Browse by shelf order	QA76.15
Computer file info	System requirements for accompanying computer disc: Windows.
LCCN	2001278111
Dewey class no.	004/.03
Type of material	Book

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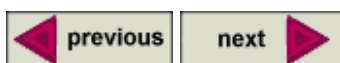


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Search Request: Left Anchored Title = computer desktop encyclopedia

Search Results: Displaying 7 of 22 entries



Computer desktop encyclopedia / Alan Freedman.

Type of Work: Text

Registration Number / Date: TX0005460718 / 2001-10-25

Title: Computer desktop encyclopedia / Alan Freedman.

Edition: 9th ed.

Imprint: New York : Osborne/McGraw-Hill, c2001.

Description: 1124 p. + CD-ROM.

Copyright Claimant: McGraw-Hill Companies, Inc.

Date of Creation: 2001

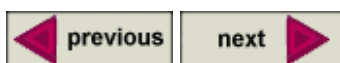
Date of Publication: 2001-08-13

Previous Registration: Prev. reg.

Basis of Claim: New Matter: editorial revisions, new & rev. material; no claim to CD-ROM.

Names: Freedman, Alan

McGraw-Hill Companies, Inc.



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BOOK

MPLS and VPN architectures

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925	0_ a acquire b 2 shelf copies x policy default
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020	__ a 1587051125 (v. 2)
040	__ a DLC c DLC d DLC
042	__ a pcc
050	00 a TK5105.573 b .G85 2001
082	00 a 004.6 2 21
100	1_ a Guichard, Jim.
245	10 a MPLS and VPN architectures / c Jim Guichard, Ivan Pepelnjak.
260	__ a Indianapolis, IN : b Cisco Press, c c2001-c2003.
300	__ a 2 v. : b ill. ; c 24 cm.
500	__ a Vol. 2 also by Jeff Apcar.
500	__ a Includes index.
650	_0 a MPLS standard.
650	_0 a Computer network architectures.

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650 _0 |a Extranets (Computer networks)

700 1_ |a Pepelnjak, Ivan.

700 1_ |a Apcar, Jeff.

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Appendix S

BOOK

MPLS and VPN architectures

Full Record

MARC Tags

Personal name

Guichard, Jim.

Main title

MPLS and VPN architectures / Jim Guichard, Ivan Pepelnjak.

Published/Created

Indianapolis, IN : Cisco Press, c2001-c2003.

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More Information

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LCCN Permalink	https://lccn.loc.gov/00105168
Description	2 v. : ill. ; 24 cm.
ISBN	1587050021 (alk. paper) 1587051125 (v. 2)
LC classification	TK5105.573 .G85 2001
Related names	Pepelnjak, Ivan. Apcar, Jeff.

5/2/22, 5:38 PM		LC Catalog - Item Information (Full Record)	
LC Subjects		MPLS standard. Computer network architectures. Extranets (Computer networks)	
Browse by shelf order		TK5105.573	
Notes		Vol. 2 also by Jeff Apcar. Includes index.	
LCCN		00105168	
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Type of material		Book	

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Appendix T

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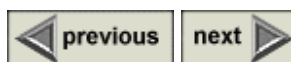
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[Labeled View](#)***MPLSand VPN architectures / Jim Guichard, Ivan Pepelnjak.*****Type of Work:** Text**Registration Number / Date:** TX0005374397 / 2001-04-19**Title:** MPLSand VPN architectures / Jim Guichard, Ivan Pepelnjak.**Imprint:** Indianapolis : Cisco Press, c2001.**Description:** 424 p.**Copyright Claimant:** Cisco Press**Date of Creation:** 2000**Date of Publication:** 2000-10-31**Names:** [Guichard, Jim, 1966-](#)
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Appendix U

Ingrid Hsieh-Yee
Professor (retired)
Dept. of Library and Information Science
Catholic University of America
Washington, D.C. 20064
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Education

Ph.D. 1990. Library and Information Studies, University of Wisconsin-Madison
Minors: Sociology and Psychology

M.A. 1984. Library and Information Studies, University of Wisconsin-Madison.

M.A. 1983. Comparative Literature, University of Wisconsin-Madison.

B.A. 1980. Foreign Languages and Literature, National Taiwan University.

Work Experience

Professor, School/Dept. of Library and Information Science, Catholic University of America,
2004-2022, retired in August 2022 (Assistant Professor, 1990-1996; Associate Professor,
1997-2004)

Co-Chair, Dept. of Library and Information Science, Catholic University of America, June 2015-
August 2016.

Acting Dean, School of Library and Information Science, Catholic University of America,
January 2010-June 2012.

Cataloger, Dept. of Legislative Reference Library, Annapolis, Maryland, 1989-1990.

Lecturer, School of Library and Information Studies, University of Wisconsin-Madison, 1988.

Teaching Assistant, School of Library and Information Studies, University of Wisconsin-
Madison, 1986-1988.

Cataloger, Health Sciences Library, University of Wisconsin-Madison, 1984-1986.

Areas of Teaching and Research Interests

Information Organization and Access; Metadata; Cataloging & Classification; Information
Architecture; Information Retrieval; Digital Collections; Social Media; Scholarly

Communication; Information Behavior; Health Informatics; Human Computer Interaction; Usability Studies

Grants & Honors

Cultural Heritage Information Management Project. IMLS grant. Amount: \$498,741. Period: Aug. 2012 to July 2015. Co-PI with Dr. Youngok Choi.

D.C. Health Information Technology (HIT4): Building Capacity & Providing Access in Our Nation's Capital. Dept. of Labor H2B Training Grant. Grant amount: \$4,175,500. Grant period: Nov. 2011 to Dec. 2015. Partner with the Metropolitan School of Professional Studies of the Catholic University of America, Children's National Medical Center, D.C. Department of Employment Services, Holy Cross Hospital, Howard University, Center for Urban Progress, Providence Hospital, and Sibley Memorial Hospital.

Capital Health Careers Project. Department of Labor Healthcare Sector and Other High Growth and Emerging Industries Grant. Grant amount: \$4,953,999. Grant period: March 2010 – February 2013. Awarded to a group of healthcare organizations and educational institutions in Washington, D.C. Providence Health Foundation of Providence Hospital (Lead institution). Part of the grant supported the development of a Master's degree program in Information Technology with a concentration in Health Information Technology offered by the School of Library and Information Science.

The Washington D.C. School Librarians Project. IMLS grant. Grant amount: \$412,660. Grant period: Aug. 2007 – June 2011. The School partnered with the District of Columbia Public Schools (DCPS) and the District of Columbia Library Association to educate and mentor school media specialists for the DCPS system. PI, Jan. 2010 to June 2011.

SIG Member of the Year, American Society for Information Science and Technology (2009).

Most Outstanding Paper of *OCLC Systems & Services* (2001).

ALISE Research Grant (2001).

Most Outstanding Paper of *OCLC Systems & Services* (2000).

Research Grant from ERIC (1999-2000).

Best Research Paper Award; Association for Library and Information Science Education (1998).

Research Grants, Catholic University of America. 1991, 1992, 1993, 1996, 1998, 1999, 2004, 2005, 2006, 2007, 2013-14.

Cooperative Faculty Research Grant, Consortium of Universities in the Washington Metropolitan Area (1993-1994).

Cooperative Research Grant, Council on Library Resources (1993-1994).

Journal of the American Society for Information Science Best Paper Award (1993).

ASIS/ISI Information Science Doctoral Dissertation Scholarship (1989).

HEA Title IIB Fellowship (Dept. of Education) (1989)

Chinese-American Librarians Association Scholarship (1987).

Beta Phi Mu (1985).

Vilas Fellowship, University of Wisconsin-Madison. 1984

Publications

Hsieh-Yee, I. (2021). Can We Trust Social Media? *Internet Reference Services Quarterly*, 1-15.
Published online: 28 July, 2021. 10.1080/10875301.2021.1947433.

Bailey, T., & Hsieh-Yee, I. (2020). Combating the Sharing of False Information: History, Framework & Literacy Strategies, *Internet Reference Services Quarterly*, 24 (1-2), 9-30.

Choi, Y., and Hsieh-Yee, I. (2010). Finding Images in an OPAC: Analysis of User Queries, Subject Headings, and Description Notes. *Canadian Journal of Information and Library Science*, 34(3): 271 – 295.

Hsieh-Yee, I. (2008). Educating Cataloging Professionals in a Changing Information Environment. *Journal of Education for Library and Information Science*, 46(2): 93-106.

Vellucci, S. L., Hsieh-Yee, I., and Moen, W.E. (2007). The Metadata Education and Research Information Commons (MERIC): A Collaborative Teaching and Research Initiative. *Education for Information*, 25(3&4): 169-178.

NISO Framework for Guidelines for Building Good Digital Collections. 3rd ed. Baltimore, MD: National Information Standards Organization, 2007. Also available online: <http://www.niso.org/framework/framework3.pdf> (NISO Working Group members: Priscilla Caplan (chair), Grace Agnew, Murtha Baca, Tony Gill, Carl Fleischhauer, Ingrid Hsieh-Yee, Jill Koelling, and Christie Stephenson.)

Choi, Y., Hsieh-Yee, I., and Kules, B. (2007). Retrieval Effectiveness of TOC and LCSH. *Proceedings of the Joint Conference on Digital Libraries*, pp. 233-234.

Vellucci, S., and Hsieh-Yee, I. (2007). They Didn't Teach Me That in Library School! Building

a Digital Teaching Commons to Enhance Metadata Teaching, Learning and Research. *Proceedings of the National Conference of the Association of College and Research Libraries, Baltimore, MD*, pp. 26-31.

Mitchell, Vanessa, and Ingrid Hsieh-Yee. (2007). Converting Ulrich's Subject Headings to FAST Headings: A Feasibility Study. *Cataloging & Classification Quarterly*, 45(1): 59-85.

Hsieh-Yee, I., Tang, R., and Zhang, S. (2007). User Perceptions of a Federated Search System. *IEEE Technical Committee on Digital Libraries Bulletin*, Summer 3(2) (URL = <http://www.ieee-tcdl.org>).

Tang, R., Hsieh-Yee, I., and Zhang, S. (2007). User Perceptions of MetaLib Combined Search: An Investigation of How Users Make Sense of Federated Searching." *Internet Reference Services Quarterly*, 12(12): 211-236.

Hsieh-Yee, I., Tang, R., and Zhang, S. (2006). User Perceptions of a Federated Search System. *Proceedings of the Joint Conference on Digital Libraries, June 11-15, 2006, Chapel Hill*, p. 338.

Hsieh-Yee, I. (2006). *Organizing Audiovisual and Electronic Resources for Access: A Cataloging Guide*. 2nd ed. Westport, Conn.: Libraries Unlimited.

NISO A Framework of Guidance for Building Good Digital Collections. 2nd ed. Bethesda, MD: National Information Standards Organization, 2004. Framework Advisory Group: Grace Agnew, Liz Bishoff, Priscilla Caplan (Chair), Rebecca Gunther and Ingrid Hsieh-Yee.

Hsieh-Yee, I. (2004). Cataloging and Metadata Education in North American LIS Programs. *Library Resources & Technical Services*, 48(1): 59-68.

Hsieh-Yee, I. (2004). Cataloging and Metadata Education. In Gary E. Gorman (Ed.), *International Yearbook of Library and Information Management 2003: Metadata Applications and Management*, (pp.204-234). London: Facet Publishing.

Yee, P. L., Hsieh-Yee, I., Pierce, G.R., Grome, R., and Schantz, L. (2004). Self-Evaluative Intrusive Thoughts Impede Successful Searching on the Internet. *Computers in Human Behavior*, 20(1): 85-101.

Hsieh-Yee, I. (2003). Cataloging and Metadata Education: A Proposal for Preparing Cataloging Professionals of the 21st Century. A report submitted to the ALCTS-Education Task Force in response to Action Item 5.1 of the *Bibliographic control of Web Resources: A Library of Congress Action Plan*. Approved by the Association for Library Collections and Technical Services. Web version available since April 2003 at <http://lcweb.loc.gov/catdir/bibcontrol/CatalogingandMetadataEducation.pdf>.

- Hsieh-Yee, I. (2002). Cataloging and Metadata Education: Asserting a Central Role in Information Organization. *Cataloging & Classification Quarterly* 34(½): 203-222.
- Hsieh-Yee, I., and Smith, M. (2001). The CORC Experience: Survey of Founding Libraries, Part I. *OCLC Systems & Services*, 17: 133-140. (Received "The Most Outstanding Paper of OCLC Systems & Services in 2001" award.)
- Hsieh-Yee, I., and Smith, M. (2001). The CORC Experience: Survey of Founding Libraries, Part II, Automated Tools and Usage. *OCLC Systems & Services*, 17: 166-177. (Received "The Most Outstanding Paper of OCLC Systems & Services in 2001" award.)
- Hsieh-Yee, I. (2001). ERIC User Services: Changes and Evaluation for the Future. *Government Information Quarterly*, 18: 31-42.
- Hsieh-Yee, Ingrid. (2001). Research on Web Search Behavior. *Library and Information Science Research*, 23: 167-185.
- Logan, E., and Hsieh-Yee, I. (2001). Library and Information Science Education in the Nineties. *Annual Review of Information Science and Technology*, 35: 425-477.
- Hsieh-Yee, I. (Ed.) (2001). *Library and Information Science Research*, 23 (2). A special issue in honor of the retirement of Douglas L. Zweizig.
- Hsieh-Yee, I. (2000). *ERIC User Services: Evaluation in a Decentralized Environment*. Washington, D.C.: Dept. of Education.
- Hsieh-Yee, Ingrid. (2000). *Organizing Audiovisual and Electronic Resources for Access: A Cataloging Guide*. Littleton, CO: Libraries Unlimited.
- Hsieh-Yee, I. (2000). Organizing Internet Resources: Teaching Cataloging Standards and Beyond. *OCLC Systems & Services*, 16: 130-143. (Received "The Most Outstanding Paper of OCLC Systems & Services in 2000" award.)
- Hsieh-Yee, I. (1998). The Retrieval Power of Selected Search Engines: How Well Do They Address General Reference Questions and Subject Questions? *Reference Librarian*, 60: 27-47.
- Hsieh-Yee, I. (1998). Search Tactics of Web Users in Searching for Texts, Graphics, Known Items and Subjects: A Search Simulation Study. *Reference Librarian*, 60: 61-85. (Received the 1997 Best ALISE Research Paper Award.)
- Hsieh-Yee, I. (1997). Access to OCLC and Internet Resources: LIS Educators' Views and Teaching Practices. *RQ*, 36: 569-86.

- Hsieh-Yee, I. (1997). Teaching Online and CD-ROM Resources: LIS Educators' Views and Practices. *Journal of Education for Library and Information Science*, 38: 14-34.
- Hsieh-Yee, I. (1996). The Cataloging Practices of Special Libraries and Their Relationship with OCLC. *Special Libraries*, 87: 10-20.
- Hsieh-Yee, I. (1996). Modifying Cataloging Practice and OCLC Infrastructure for Effective Organization of Internet Resources. In *Proceedings of the OCLC Internet Cataloging Colloquium*. [Online]. Available: <http://www.oclc.org/oclc/man/colloq/hsieh.htm>
- Hsieh-Yee, I. (1996). Student Use of Online Catalogs and Other Information Channels. *College & Research Libraries*, 57: 161-175.
- Hsieh-Yee, I. (1995). Ten entries in James S. C. Hu (Ed.), *Encyclopedia of Library & Information Science*, 913, 1028-29, 1036, 1037, 1145-46, 1514, 1575, 1763-64, 2216-27, 2378-79. Taipei, Taiwan: Sino-American Publishing. (Topics include "Advanced Technology/Libraries," "Information Ethics," "Instruction on Cataloging and Classification," "Instruction on Reference Services.")
- Hsieh-Yee, I. (1993). Effects of Search Experience and Subject Knowledge on Online Search Behavior: Measuring the Search Tactics of Novice and Experienced Searchers. *Journal of the American Society for Information Science*, 44: 161-174. (Received the 1993 Best JASIS Paper Award.)

Works in Progress

- Hsieh-Yee, I. Actionable lessons for debunking false information: A comparative analysis of literacy lessons in communication and library and information science
- Hsieh-Yee, I. Representing diverse voices and communities in cataloging and indexing: The evolution of controlled vocabularies
- Hsieh-Yee, I. Information Organization and Retrieval in Practice (a monograph scheduled for completion and publication in 2023)

Presentations

- Bailey, T. & Hsieh-Yee, I. (February 2020). The Phenomena of Sharing Misinformation and the Need for Information Literacy. Presented at the 2020 Bridging the Spectrum Symposium, Washington, D.C., February 14, 2020.

- Hsieh-Yee, I. and Fragan-Fly, J. (May 2018) Trends, Design & Strategies for Digital Scholarship Services. Presented at the 2018 Maryland/Delaware Library Association Conference, Cambridge, MD.
- Hsieh-Yee, I. (February, 2018) Research Data Management: What It Takes to Succeed. Presented at the 10th Bridging the Spectrum Symposium, Washington, D.C.
- Hsieh-Yee, I. (February, 2017) *Research Data Management: New Competencies and Opportunities for Information Professionals*. Presented at the 9th Bridging the Spectrum Symposium, Washington, D.C.
- Hsieh-Yee, I. and Lawton, P. (February, 2017) *Enhancing Catholic Portal Searches with User Terms and LCSH*. Presented at the 9th Bridging the Spectrum Symposium, Washington, D.C.
- Hsieh-Yee, I. (2016, October) *Visualizing Data for Information*. Presented at the 2016 Virginia Library Association Conference, Hot Springs, VA.
- Hsieh-Yee, I. (2016, August) *Religious Materials Toolbox for Archivists: Solutions to Problems Facing the Profession*. Presented at Archives * Records 2016, Atlanta, GA.
- Hsieh-Yee, I. and Lawton, P. (2016, March) *Enhancing Retrieval of Catholic Materials with LCSH Knowledge Structure*. Presented at the 2016 Catholic Library Association Conference, San Diego, CA.
- Fagan-Fry, J. and Hsieh-Yee, I. (2016, February) *Approaches to Digital Scholarship at Top Universities around the World: Scholarly Publishing in the Digital Age*. Presented at the 8th Bridging the Spectrum Symposium, Washington, D.C.
- Hsieh-Yee and Fagan-Fry, J. (2016, January) *Innovative Services for Digital Scholarship at Top 100 Research Libraries of the World*. Poster presented at the 2016 Annual Conference of the Association for Library and Information Science Education, Boston, Mass.
- Hsieh-Yee, I. and Lawton, P. (2015, June). *Crowdsourcing terms for CRRA portal themes*. Poster presented at the third CRRA symposium and annual meeting, Bringing the created toward the Creator: Liturgical art and design since Vatican II. Catholic Theological Union, Chicago, Illinois.
- Hsieh-Yee, I. and Lawton, P. (2015, February). *Crowdsourcing terms for thematic exploration in the Catholic Portal*. Poster presented at the 7th Annual Bridging the Spectrum Symposium, Washington, D.C.
- Hsieh-Yee, I., James, R., and Fagan-Fry, J. (2015, February). *Support for digital scholarship at top university libraries of the world*. Poster presented at the 7th Annual Bridging the Spectrum Symposium, Washington, D.C.

- Hsieh-Yee, I., Zhang, S., Lin, K., and Cherry, S. (2015, February). *Thus said the end users: Summon experience and support for research workflows*. Poster presented at the 7th Annual Bridging the Spectrum Symposium, Washington, D.C.
- Yontz, E., Hsieh-Yee, I., & Houston, S. (2015, February). *Healthy Heroes Summer Reading Club: Developing healthy youth at public libraries*. 11th Annual Jean Mills Health Symposium, Greenville, North Carolina.
- Yontz, E., Hsieh-Yee, I., and Houston, S. (2015, January). *Healthy youth and libraries: A pilot study*. Association for Library & Information Science Education (ALISE) Annual Conference, Chicago, Illinois.
- Hsieh-Yee, I. (2014, May). *Linking CRRA resources to portal themes via authority files*. Presented at the Catholic Research Resources Alliance 2014 Membership Meeting, Marquette, WI.
- Hsieh-Yee, I. (2014, April). *Enhancing subject access to CRRA resources*. Presented at the 2014 Catholic Library Association Conference, Pittsburgh, PA.
- Hsieh-Yee, I. (2014, January). *Health Information Technology Program: Educational entrepreneurship in action*. Presented at the 2014 annual Conference of the Association for Library and Information Science Education, Philadelphia, PA.
- Hsieh-Yee, I., Zhang, S., Lin, K., and Cherry, S. (2014, January). *Discovering information through Summon: An analysis of user search strategies and search success*. Paper presented at the 6th Bridging the Spectrum Symposium, Washington, D.C.
- Hsieh-Yee, I. (2012, December). *National Digital Stewardship Alliance and SLIS at CUA: An Educational Partnership*. Paper presented at Best Practices Exchange: Acquiring, Preserving, and Providing Access to Government Information in the Digital Era, Annapolis, MD.
- Choi, Y. and Hsieh-Yee, I. (2010, January). *Finding Images in an OPAC: Analysis of User Queries, Subject Headings, and Description Notes*. Paper presented at 2nd Annual Bridging the Spectrum Symposium, Catholic University of America, Washington, D.C.
- Hsieh-Yee, I. and Coogan, J. (2010, January). *Google Scholar vs. Academic Search Premier: What Libraries and Searchers Need to Know*. Paper presented at 2nd Annual Bridging the Spectrum Symposium, Catholic University of America, Washington, D.C.
- Hsieh-Yee, I. (2009, November). *Information Science Education: An LIS School's Perspective*. Paper presented at Annual Meeting of the American Society for Information Science and Technology, Vancouver, British Columbia, Canada.

- Hsieh-Yee, I., Menard, E., Ya-Ning Chen, A., Shu-Jiun Chen, S., Kalfatovic, M. R., Wisser, K. M. (2009, November). *Information Organization in Libraries, Archives and Museums: Converging Practices and Collaboration Opportunities*. Presented at Annual Meeting of the American Society for Information Science and Technology, Vancouver, British Columbia, Canada. (Organizer and moderator of this panel.)
- Hsieh-Yee, I. and Coogan, J. (2009, July). *Catching up to Google Scholar: The Retrieval Power of Academic Search Premier and Google Scholar*. Poster presented at American Library Association Conference, Chicago, Illinois.
- Hsieh-Yee, I., with the CUA Scholarly Communications Project Team. (2009, January). *Digital Scholarship@CUA: Developing an Institutional Repository for CUA*. Poster presented at 1st Annual Bridging the Spectrum Symposium, Catholic University of America, Washington, D.C.
- Wise, M., Cylke, K., and Hsieh-Yee, I. (2009, January). *Digital Talking Books: Meeting the Needs of the Blind and the Handicapped*. Paper presented at the Bridging the Spectrum Symposium, Catholic University of America, Washington, D.C.
- Hsieh-Yee, I. (2009, January). *User Expectations of MERIC*. Presented at the Information Organization Competencies for the 21st Century Discussion Session of the 2009 Conference of the Association for Library and Information Science Education, Denver, Colorado.
- Choi, Y., and Hsieh-Yee, I. (2008, November). *Subject Access for Images in an OPAC*. Annual Meeting of the American Society for Information Science and Technology, Columbus, Ohio. (Also co-organized a panel on Retrieving and Using Visual Resources: Challenges and Opportunities for Research and Education.)
- Hsieh-Yee, I. (2008, June). *Educating Cataloging Professionals in a Changing Information Environment*. National Taiwan University, Taipei, Taiwan.
- Vellucci, S. L., Moen, W.E., Hsieh-Yee, I., Marson, B., and Wisser, K. (2008, January) *Building a Metadata Education and Research Community through MERIC (Metadata Education and Research Information Commons): Demo and Stakeholder Input*. A panel presented at the 2008 Conference of the Association for Library and Information Science Education, Philadelphia, Pennsylvania.
- Hsieh-Yee, I., Choi, Y. and Kules, B. (2007, October). *Searching for Books and Images in OPAC: Effects of LCSH, TOC and Subject Domains*. A poster presented at the American Society for Information Science and Technology Annual Meeting, Milwaukee, Wisconsin.
- Hsieh-Yee, I. and Coogan, J. (2007, August) *Google Scholar vs. Academic Search Premier: A Comparative Analysis*. Presented to the Faculty and Staff of the University of the District

of Columbia.

- Hsieh-Yee, I. and Coogan, J. (2007, June). *Google Scholar vs. Academic Search Premier: A Comparative Analysis*. Presented to the Washington Research Library Consortium Community, Catholic University of America, Washington, D.C.
- Hsieh-Yee, I., Choi, Y., and Kules, B.. (2007, June). *What Users Need for Subject Access: Table of Contents or Subject Headings?* A poster presented at the 2007 American Library Association Annual Conference, Washington, D.C., June 2007.
- Choi, Y., Hsieh-Yee, I., and Kules, B. (2007, June). *Retrieval Effectiveness of TOC and LCSH*. A paper presented at the Joint Conference on Digital Libraries 2007, Vancouver, Canada.
- Vellucci, S. L., Hsieh-Yee, I., and Moen, W.E. (2007, May). *If We Build It, Will They Come? Building a Community of Practice for Metadata Stakeholders*. A poster presented at the Rutgers University Research Day, Bridgeton, New Jersey.
- Hsieh-Yee, I. (2007, May). *Federated Searching: User Experience & Perceptions*. International Conference on Information Organization & Retrieval, National Taiwan University, Taipei, Taiwan.
- Hsieh-Yee, I. (2007, May). *Search Performance of Google Scholar and Academic Search Premier*. International Conference on Information Organization & Retrieval, National Taiwan University, Taipei, Taiwan.
- Hsieh-Yee, I. (2007, May) *MERIC: Building a Digital Commons for Metadata Education & Research*. International Conference on Information Organization & Retrieval, National Taiwan University, Taipei, Taiwan.
- Hsieh-Yee, I., and Coogan, J. (2007, March/April). *A Comparative Analysis of Google Scholar and Academic Search Premier*. Poster presented at the Association of College & Research Libraries 13th National Conference, Baltimore, Maryland.
- Vellucci, S. L. and Hsieh-Yee, I. (2007, March/April) *They Didn't Teach Me That in Library School! Building a Digital Teaching Commons to Enhance Metadata Teaching, Learning and Research*. On-site presentation and Webcast by Elluminate. A contributed paper presented at the Association of College & Research Libraries 13th National Conference, Baltimore, Maryland. The acceptance rate for contributed paper was 20%. This paper was one of 10 conference papers chosen for live webcast during the conference.
- Moen, W., Hsieh-Yee, I. and Vellucci, S.L. (2007, January) *A DSpace Foundation for a Teaching & Research Commons: The Metadata Education and Research Information Commons*. A poster session presented at the Open Repositories Conference 2007, San Antonio, Texas.

- Tang, R., Hsieh-Yee, I., and Zhang, S. (2006, November) *User Perception of MetaLib Combined Search*. Paper presented at the Annual Meeting of the American Society for Information Science and Technology, Austin, Texas, Nov. 2006.
- Hsieh-Yee, I. (2006, November). *Federated Searching: User Perceptions, System Design, and Library Instructions*. Paper presented at the Annual Meeting of the American Society for Information Science and Technology, Austin, Texas. (Panel organizer, moderator, presenter).
- Hsieh-Yee, I. (2006, November). *Building a Digital Teaching Commons to Enhance Teaching and Learning: The MERIC Experience and Challenges*. Paper presented at the Annual Meeting of the American Society for Information Science and Technology, Austin, Texas. (Panel organizer, moderator, presenter)
- Hsieh-Yee, I. (2006, September). *Search Performance of Google Scholar and Academic Search Premier*. Paper presented at the ERIC Publishers Meeting, Washington, D.C.
- Hsieh-Yee, I., Zhang, S., and Rong Tang, R. (2006, June). *User Perceptions of a Federated Search System*. Poster presented at Joint Conference on Digital Libraries, Chapel Hill, North Carolina.
- Hsieh-Yee, I. and Zhang, S. (2006, June). *Preparing Users for Federated Search: Implications of a MetaLib User Perceptions Study*. Paper presented at the 2006 Ex Libris User Groups of North America Conference, Knoxville, Tennessee.
- Hsieh-Yee, I. (2006, January). *MERIC Organizations and Navigation*. Paper presented at the 2006 ALISE Annual Conference, San Antonio, Texas.
- Hsieh-Yee, I. (2006, January). *Metadata and Cataloging Education: Recommended Competencies*. Paper presented at the 2006 ALISE Annual Conference, San Antonio, Texas.
- Hsieh-Yee, I. (2005, November). *Digital Library Evaluation: Progress & Next Steps*. Presentation at the Annual Meeting of the American Society for Information Science & Technology, Charlotte, North Carolina.
- Hsieh-Yee, I. (2005, August). *Providing Access to Digital Content: Issues for DL Managers*. Presentation at MDK12 Digital Library Steering Committee Meeting, Columbia, Maryland.
- Hsieh-Yee, I. (2005, April). *Enhancing Teaching and Learning: The Role of School Library Media Specialists*. Presentation at Meeting of the Baltimore County Public School System School Media Specialists, Baltimore, Maryland.

- Hsieh-Yee, I. (2005, January). *Subject Access and Users: Insights & Inspirations from Marcia J. Bates*. Paper presented at the Historical Perspectives SIG, 2005 Conference of the Association for Library and Information Science Education, Boston, Massachusetts.
- Hsieh-Yee, I. (2005, January). *Electronic Resource Management: Practice, Employer Expectations, & CE Interests*. Paper presented at Technical Services Education SIG, 2005 Conference of the Association for Library and Information Science Education, Boston, Massachusetts.
- Hsieh-Yee, I. (2004, October). *Library Professionals for the Digital Age: Competencies & Preparation*. Paper presented at Bibliographic Access Management Team meeting, Library of Congress, Washington, D.C.
- Hsieh-Yee, I. (2004, January). *Cataloging and metadata expertise for the digital era*. Presented at Preparing 21st Century Cataloging and Metadata Professionals: A Workshop for Educators and Trainers, San Diego and sponsored by ALCTS, ALISE, LC, and OCLC.
- Hsieh-Yee, I. (2004, January). *Educating catalogers for the digital era*. Paper presented at the Technical Services SIG, 2004 Conference of the Association for Library and Information Science Education, San Diego.
- Hsieh-Yee, I. (2003, July). *Cataloging Education for the 21st Century*. A presentation at the Library of Congress, Washington, D.C.
- Hsieh-Yee, I. (2002, January) *Metadata Education and Research Priorities: A Delphi Study of Metadata Experts*. Presentation at the 2002 Conference of the Association for Library and Information Science Education, New Orleans.
- Hsieh-Yee, I. (2001, November). *A Delphi Study of Metadata: Preliminary Findings*. Poster session at the 2001 Annual Meeting of the American Society for Information Science & Technology, Washington, D.C.
- Hsieh-Yee, I. (2001, June). *Resources on Asian American Children: Analysis of Retrieval by Search Engines and WorldCat*. Presentation at the National Conference on Asian Pacific American Librarians, San Francisco.
- Hsieh-Yee, I. (2001, January). *Delphi Study on Metadata: Project Design*. Presentation at Research Awards Session, Association for Library & Information Science Education, Washington, D.C.
- Hsieh-Yee, I. (2000, May). *Web Search Behavior Research: Progress and Implications*. Presentation at the Symposium on Evaluating Library and Information Science Research, University of Wisconsin-Madison, Madison, Wisconsin.

- Hsieh-Yee, I. (2000, March). *ERIC User Services: Evaluation in a Decentralized Environment*. Presentation at the National ERIC Joint Directors/Technical Meeting, Arlington, Virginia.
- Hsieh-Yee, I. (2000, January). *Enhancing Learning with Web Technology*. Presentation at Faculty Conversations, Catholic University of America, Washington, D.C.
- Hsieh-Yee, I. (2000, January). *From Surrogates to Objects: CUA's Approaches to Organizing Electronic Resources*. Paper presentation at the Annual Conference of the Association for Library and Information Science Education, San Antonio, Texas.
- Yee, P., and Hsieh-Yee, I. (1997, November). *Individual Differences in Search Behavior on the WWW*. A poster session presented at the 38th Annual Meeting of the Psychonomic Society, Philadelphia, Pennsylvania.
- Hsieh-Yee, I. (1997, April). *Research + Marketing + Preparation = Job!* Presented at the "Workshop on Resume and Interview Techniques," Special Libraries Association, Student Chapter, Catholic University of America, Washington, D.C.
- Hsieh-Yee, I. (1997, February). *Creating CyberCatalogers: Education and Training*. Presentation at ALA's Midwinter Meeting, Washington, D.C.
- Hsieh-Yee, I. (1997, February). *Search Tactics of Web Users in Searching for Texts, Graphics, Known Items and Subjects: A Search Simulation Study*. Presented at the Conference of the Association for Library and Information Science Education, Washington, D.C.
- Hsieh-Yee, Ingrid. "Beginning Your Special Library/Information Center Career." Presented at SLA's "Career Day," Jan. 11, 1997, Catholic University of America.
- Hsieh-Yee, I. (1996, September). *The Roles of Library and Information Scientists in Managing Electronic Information*. Presentation at Hamilton College, Clinton, New York.
- Hsieh-Yee, I. (1996, May). *The Future of Cataloging as a Profession*. Presented at "The Cataloging Forum, Library of Congress, Washington, D.C.
- Hsieh-Yee, I. (1994, October). *The Impact of the Internet on OPACs*. Presented at the Third Workshop on User Interfaces for OPACs, Library of Congress, Washington, D.C.

Reports

- Hsieh-Yee, I., with Knowledge Management Competencies and Performance Action Group of the Federal Knowledge Management Initiative. "From Knowledge Management Competencies to Improved Organizational Performance." April 9, 2009.

Hsieh-Yee, I., with Knowledge Practices Action Group of the Federal Knowledge Management Initiative. "KM Practice in Government Agencies: Findings and Recommendations." April 9, 2009.

Hsieh-Yee, I. "Delphi Study on Metadata." 2001. Three quarterly reports submitted to the Association for Library and Information Science Education.

Hsieh-Yee, I. "College Students' Information Channels: Patterns of Use and Possible Factors in Channel Selection." 1995. Submitted to the Catholic University of America.

Hsieh-Yee, I. "The Information-Seeking Patterns of Scholars and Their Use of an Online Information System." 1994. Submitted to the Council on Library Resources.

Book Reviews

Review of *The Measurement and Evaluation of Library Services*, by Sharon L. Baker and F. Wilfrid Lancaster. *Information Processing and Management* 30 (1994): 450-52.

Review of *Subject Access to Films and Videos*, by Sheila S. Intner and William E. Studwell; and *Cataloging Unpublished Nonprint Materials*, by Verna Urbanski with Bao Chu Chang and Bernard L. Karon. *Information Processing and Management* 30 (1994): 449-50.

Review of *Automated Information Retrieval in Libraries: A Management Handbook*, by Vicki Anders. *Journal of Library and Information Science* 19 (1993): 98-100.

Review of *Full Text Databases*, by Carol Tenopir and Jung Soon Ro. *Information Processing and Management* 28 (1992): 667-68.

Review of *Descriptive Cataloging for the AACR2R And USMARC: A How-to-Do It Workbook*, by Larry Millsap and Terry Ellen Ferl. *Information Processing and Management* 28 (1992): 809-11.

Review of *MARC Manual: Understanding and Using MARC Records*, by Deborah J. Byrne. *Information Processing and Management* 28 (1992): 537-38.

Service

Professional Associations and Societies

- Library of Congress. RDA Training Program for the Profession. Co-authored with Tim Carlton. 2013-2014.
- 2014 Digital Preservation Outreach & Education Survey. Contributed to the design of the survey, 2014.
- National Digital Stewardship Alliance. Outreach Committee. 2011-2014.
- National Digital Stewardship Residency Program. Advisory Group, 2012-2013.
- FEDLINK Health Information Technology Advisory Council, 2011-2015.

- 2012 Joint Conference on Digital Libraries. Program Planning Committee, Pre-Conference Proposals Review Committee, 2012
- Catholic Research Resources Alliance. Five-Year Strategic Plan Task Force, 2011-2012
- Institute of Museum and Library Services. Grant reviewer. 2004, 2005, 2010.
- Association for Library and Information Science Education.
 - * ALISE Bodan Wynar Research Paper Award Committee, 2015, 2016, 2017
 - * ALISE Eugene Garfield Dissertation Award Competition, Jury, 2013, 2014
 - * ALISE Research Grant Competition Committee. Chair, 2012
 - * Pratt-Severn Faculty Innovation Award. Chair, 2009, 2010
 - * ALISE Doctoral Poster Jury, 2012
 - * “Information Organization Competencies for the 21st Century” Discussion session leader. 2009 Conference of the Association for Library and Information Science Education.
 - * Assisted Technical Services SIG Convener in organizing a program, “Building a Metadata Education and Research Community through MERIC (Metadata Education and Research Information Commons): Demo and Stakeholder Input” for the 2008 ALISE conference.
 - * Association for Library Collections and Technical Services/Association for Library and Information Science Education (ALCTS/ALISE) Metadata Education and Research Information Center (MERIC) Advisory Board, Co-Chair (with Sherry Vellucci), 2005-2007. Chair, 2008-2009 (leading the effort to build MERIC, a repository and collaborative space for metadata educators, practitioners, and researchers)
 - * Technical Services SIG, Convener, 2004-2005. Organized a program on “Electronic Resources Management: Current Practices, Employer Expectations, and Teaching Strategies” for the 2005 conference in Boston, Massachusetts.
 - * Technical Services SIG, Convener, 2003-2004. Organized a program on “Organizing Information with Metadata: Desired Competencies and Teaching Innovations” for the 2004 conference.
 - * Technical Services SIG, Convener, 1999-2000. Organized a program on "Teaching the Organization of Electronic Resources" for the 2000 conference.
 - * Curriculum SIG, Co-convener (with Sibyl Moses), 1996-97. Organized a program on “Government Information Policy” for the 1997 conference.
- American Society for Information Science & Technology.
 - * Reviewer, Conference program panel submissions and poster submissions, 2005, 2006, 2007, 2009, 2011, 2012, 2013, 2014, 2015, 2016, 2017
 - * Nomination Committee, 2009-2011
 - * Information Science Education Special Interest Group. American Society for Information Science and Technology. Chair-Elect, 2007-2008. Chair 2008-2009.
 - * Committee on Information Science Education. 1999-2006.
 - * Committee on Information Science Education. Organizing Committee for an orientation program for students at ASIS annual meetings, 1999-2001
 - * Committee on Information Science Education. Sub-committee on Student Welfare (focusing on issues related to master's education), 1998-2001

- * SIG ED. Organizing Committee for the "Seminar on Research and Career Development" for junior researchers. 1995-96 (chair), 1997-2001
- * ISI Doctoral Dissertation Proposal Scholarship Jury, 1997; 2001, 2002
- * Pratt-Severn Best Student Research Paper Award Jury. Chair. 1997
- * 1998 Midyear Meeting (referee of contributed papers), 1997
- * Organizer and moderator of the ASIS Doctoral Forum and the Doctoral Research Seminar 1994-1995
- * SIG Human Computer Interaction. Chair-Elect, Chair, 1993-1995
- * Doctoral Forum Award Jury, 1995
- * Best Student Paper Award Jury, 1995
- American Library Association.
 - * Committee on Accreditation, External Review Panelist, 2009- (site visiting team 2013-2014; site visiting team 2016-2017)
 - * Association for Library Collections and Technical Services Task Force on Competencies and Education for a Career in Cataloging, member, 2008-2009
 - * Facilitator for "What They Don't Teach in Library School: Competencies, Education and Employer Expectations for a Career in Cataloging," an Association for Library Collections and Technical Services Preconference, June 22, 2007 in Washington, D.C. Also a local liaison for bringing this program to the Catholic University of America.
 - * Facilitator for a discussion on "Effect of Electronic Resources on Technical Services" at ALA's Midwinter Meeting held in Feb. 1997 in Washington, D.C.
 - * International Relations Committee, Subcommittee Task Force for IFLA and China, 1994-1997
- Virginia Association of School Librarians. Scholarships and Awards Committee. 2010-2012
- Federal Knowledge Management Initiative, Knowledge Management Practices Action Group. Member. 2009 (leading the effort to build a knowledge management repository)
- Federal Knowledge Management Initiative, Knowledge Management Competencies & Learning Action Group. Member. 2009 (developing an action plan for helping government knowledge workers and government agencies to develop knowledge management competencies)
- National Center for Education Statistics. Technical Review Panel. 2008.
- External evaluator for a case of promotion to full professorship. University of Tennessee. 2008.
- National Information Standards Organization (NISO). Advisory Board, Revision of "IMLS Framework of Guidance for Building Good Digital Collections," 2004, 2007.
- Library of Congress, Bibliographic Control of Web Resources: A Library of Congress Action Plan. Principal Investigator of Action Item 5.1, focusing on cataloging and metadata education for students and new librarians, 2002-2003. (worked with the Association for Library Collections and Technical Services, Education Task Force)

- Chinese American Librarians Association
 - * Chinese American Librarians Association Outstanding Library Leadership Award in Memory of Dr. Margaret Chang Fung, Award Committee, 2016-2017
 - * Achievement Award Jury, 2000-2001
 - * CALA Goal 2000 Task Force, 1997
 - * Scholarship Committee, 1995, 1996-1997 (chair)
 - * Board of Directors, 1994-1997
 - * Publication Committee, 1993-1995
 - * International Relations Committee, 1993-1996
- SailorSM Assessment Advisory Group (An impact study of Sailor, Maryland's Public Information Network), 1995
- Editorial boards
 - Journal of Library & Information Science. Editorial Board, 2012-
 - Chinese American Librarians Association, *Occasional Papers Series*. Editorial Board, 2009-2016.
 - Library Quarterly*. Editorial Board, 2003-2008
 - Bulletin of the Medical Library Association*, 1994-97
 - Newsletter editor for the Chinese American Librarians Association, 1989-92
- Referee for the following journals
 - Information Processing and Management*
 - Journal of Digital Information*
 - Journal of Education for Library and Information Science*
 - Journal of Information Science*
 - Journal of Library & Information Science*
 - Journal of Library Metadata*
 - Journal of the American Society for Information Science & Technology*
 - Library and Information Science Research*
 - Library Quarterly*
- Expert reviewer, “Digital Library” course, Evaluation module, University of North Carolina, Chapel Hill, 2007-2008.
- Expert reviewer, “Information Organization” course, University of Michigan, Ann Arbor. 2007.

Catholic University of America

- Academic Senate Committee on Appointments and Promotions, 2005-2008
- Academic Senate Committee on Committees and Rules, 2009-2012, 2019-2022
- Academic Senate representative (for School of Arts & Sciences), 2017-2020

- Academic Senate representative (for School of Library & Information Science) 2003-2012
- Academic Senate Library Committee, Interim Chair (2007), Member, 2008-2012
- Academic Senate Committee on Computing, 1995-2003
- President's Administrative Council, 2010-2012
- Deans' Council, 2010-2012
- Academic Leadership Group, 2010-2012
- Graduate Board, 2010-2012
- School of Arts & Sciences, Committee on Appointments and Promotions, 2015-2019
- School of Arts & Sciences, Academic Council, 2015-2016.
- School of Arts & Sciences, Ordinary Professor Group, 2013-
- Doctoral Dissertation Defense Committee, Chair, Dept. of Psychology, 2016, 2017, 2018, 2019, 2020, 2021, 2022
- Doctoral Dissertation Defense Committee, Chair, Dept. of Education, 2014, 2015, 2017, 2018, 2019
- Doctoral Dissertation Defense Committee, Chair, National Catholic School of Social Services, 2019, 2020, 2021
- Doctoral Dissertation Defense Committee, Chair, School of Nursing, 2006, 2008
- CUA Scholarly Communication Project Team, Member (2007), Chair, 2008-2009
- Dean Search Committee, 1992-1994, 1998-1999, 2002-2003, 2006-2007
- Fulbright Review Panel, 2006
- CUA Service Learning Advisory Board, 2001-2002
- CUA Faculty Conversations on Enhancing Teaching and Learning through Technology, Planning Group, 1999-2001
- CUA Initiative on Technology and Teaching, 1998-2001

Dept. of Library and Information Science

- Admissions Committee, 2007-2009, Chair 2010-2012, Member 2013-2015, Member 2018-2022
- Appointments and Promotions Committee, 1991-2022
- Student advisement, 1990-2022
- 4+1 Bachelor to Master program, Program Advisor, 2014-2022
- LIS Minor, Advisor, 2017-2022
- Curriculum Committee, 2020-21 (Member), 2021-2022 (Chair)
- Scholarship & Awards Committee, 2016-2018, 2020-21
- Comprehensive examination editor, 2020-21
- Symposium, Colloquium, Lecture Series Committee, May 2018-May 2020 (Chair)
- Symposium and Colloquium Committee, fall 2016-May 2018
- Bridging the Spectrum Symposium session moderator, 2018, 2019, 2020, 2021

- Organization of Information Core Course Outcomes Assessment, 2019, 2020
- The Information Professions in Society Core Course Outcomes Assessment, 2019, 2020
- Community Services Librarianship, Course of Study Review and Revision, 2020
- Organization of Information, Course of Study Review and Revision, 2019
- Organization of Information, Competency and Course Offerings Review, 2018-2019
- Accreditation presentation, Chair, June 2015-August 2016
- Interim Co-Chair, June 2015-August 2016.
- Blended/OWL Learning Committee, spring 2016-2018
- Technology Committee, fall 2016-2017
- Comprehensive examination editor, 2016-2017, reader (every year since 1990)
- LIS Advisory Board, 2015-2016 (chair); fall 2016- May 2018 (member)
- Committee on Planning and Assessment, 2015-2016 (chair)
- Senior Faculty Committee, 2014-2016.
- Accreditation Steering Committee, 2014-2016 (Chair, 2015-2016)
- Accreditation Students Standard Committee, co-chair, 2014-2016
- Accreditation Mission, Goals, and Objectives Standard Committee, co-chair, 2014-2016
- Accreditation Curriculum Standard, member 2014-2-16
- Accreditation Administration and Finance Standard, member 2014-2016
- Cultural Heritage Information Management Project (IMLS-funded), Co-PI, 2012-2015
- Cultural Heritage Information Management Forum (scheduled for June 2015), Co-Organizer, 2013-2015
- Health Information Technology Interim Review Committee, 2015 (chair)
- Health Sciences Librarianship Advisory Group, 2015- (chair)
- Comprehensive examination editors, 2013-2014, 2016-2017
- National Digital Stewardship Alliance liaison, 2011-2014
- Advisory Board, Chair 2010-2012
- Academic Honesty Committee, Chair, 2008-2012
- Blended Learning Committee, 2010-2012
- Colloquium Committee, 2010-2012
- Comprehensive Examination Administration, 2010-2012
- Cultural Heritage Information Management Advisory Committee, 2010-2012 (chair), 2013-
- Curriculum Committee, 1991-2003, 2007-2009, Chair 2010-2012, member 2013-
- Curriculum Subcommittee on Comprehensive Examination, Chair 2009-2012
- Health Information Technology Advisory Board, Chair 2010-2012. Member 2013-
- Health Sciences Advisory Committee, 2009, Chair 2010-2012. Member 2013-
- HIT Expert Forum, Chair 2012. Member 2013-2015
- Health Information Technology Student Group Advisor, 2011-2012
- State Council for Higher Education of Virginia, SLIS Representative, 2010-2012
- Symposium Planning Committee, 2010-2012
- Website Management Team, Chair, 2010-2012
- Urban School Librarianship Project (IMLS-Funded), PI, 2007-2011 (chair, 2010-11)

- Failing Grades Committee, 1995-1997 (chair), 2000-2001 (chair), 2004-2005 (chair), 2007 (chair)-2011
- Faculty Search Committee, 1994-1998, 2002-2004, 2006 (chair), Fall 2007-2009, Chair fall 2009-2012
- Recruitment Committee, Chair 2010-2012
- Strategic Planning Committee, Chair 2010-2012
- Technology Committee, 2010-2012
- Accreditation Advisory Committee, 2007-2009
- Accreditation Coordinating Committee, 2007-2009
- Accreditation Steering Committee, 2007-2009
- SLIS Advisory Group, 2007-2009
- Accreditation Curriculum Standard Committee, Co-chair, 2007-2009
- Accreditation Faculty Standard Committee, Co-chair, 2007-2009
- LSC 551 Information Organization Review Team, Co-chair, 2008-2009, 2015-2016.
- Curriculum Subcommittee on Portfolios, 2009
- LSC 555 Information Systems in Libraries and Information Centers Review Team, contributor, 2008-2009
- Redesign of LSC 730 Use and Users of Libraries and Information. 2009-
- Development of a metadata institute that was taught as LSC 715 Organization of Internet Resources in 2008. The institute is being revised and will be offered in 2010 under a new course title.
- Development of lesson plans, assignments, and evaluation rubrics for LSC 606, Cataloging and Classification, for the School's NCATE accreditation. 2008
- Howard and Mathilde Rovelstad Scholarship Committee, Chair, 2004-2007
- Assistant Dean Search Committee, Chair, Fall 2007
- Liaison to the Association for Library Collections and Technical Services to bring its preconference program, Cataloging Education and Employer Expectations, to CUA during the 2007 American Library Association Annual Meeting in Washington, D.C.
- Organizer of the colloquium presentation and reception for Tamar Sadeh of Ex Libris on PRIMO June 2007
- Practicum review and design (work with potential supervisors, such as the American Indian Museum internship description revision) 2006-
- Comprehensive examinations (edits, proctoring, and grading), 1990-
- SLIS Web site redesign: Comments and suggestions. Fall 2007
- Conducted surveys of current students and alumni in preparation for the 2005 re-accreditation, 2004-2005
- Technology Committee, 1992-1999 (chair, 1996-1998), 2002-2003 (member)
- Colloquia Committee 1997-1999, 2002-2003.
- Advisor of the CUA Student Chapter of the American Society for Information Science and Technology, 2002-2003
- Visiting Professor Search Committee, 1999, 2000, 2001
- Leader, Participation in the CORC experiment, 1999-2000
- Advisor of the Special Libraries Association Student Chapter, 1993-1999; the group was recognized for outstanding leadership by SLA in 1999.

- COA planning Committee, Task Force on Electronic Presentation of SLIS Reports (team leader) 1997-1998
- COA Planning Committee, Subcommittee on Technology 1996-1998
- NLM practicum coordinator, 1997-1998
- Computer Literacy Workshops: Assisted with the development and evaluation of the workshops, 1996-1998
- Leader, Participation in the InterCat project, 1995-1997