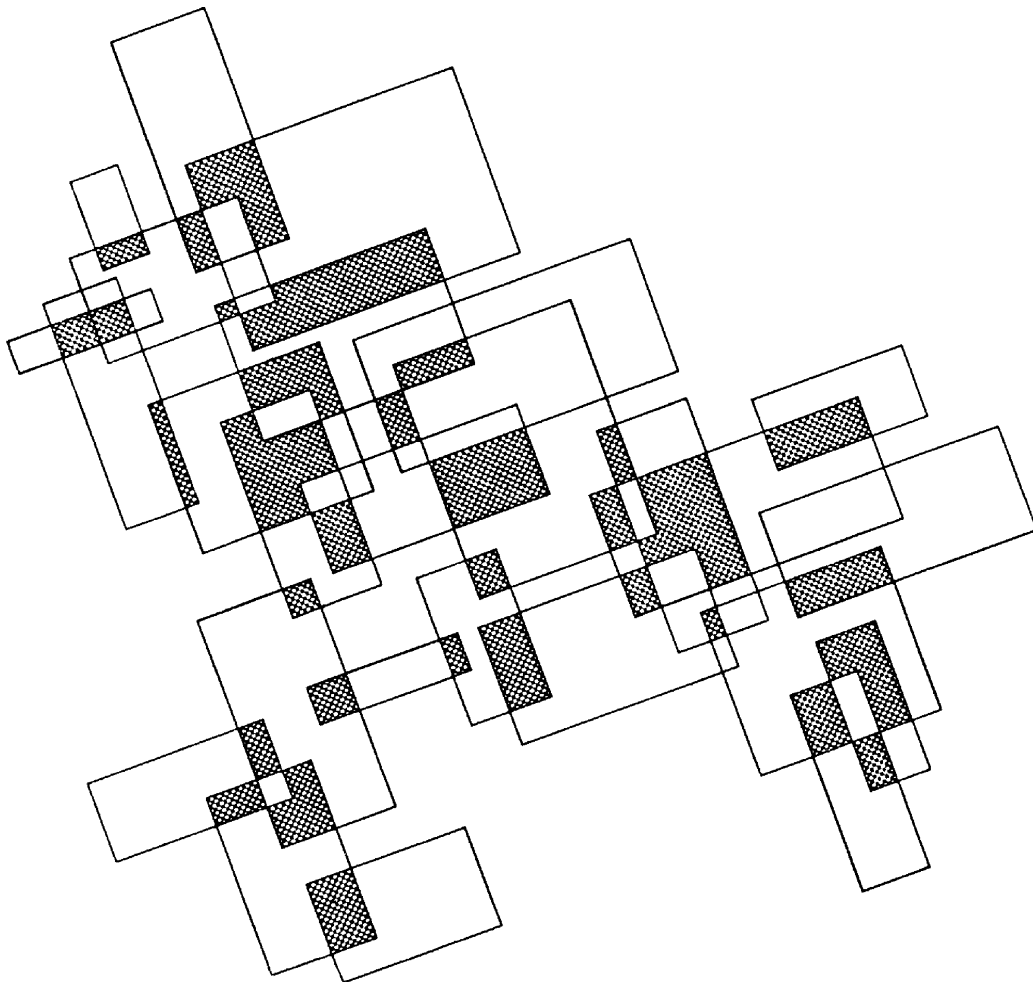Information Technology:

A Quick-Reference List of Organizations and Standards for Digital Rights Management

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Reports on Information Technology

The Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST) stimulates U.S. economic growth and industrial competitiveness through technical leadership and collaborative research in critical infrastructure technology, including tests, test methods, reference data, and forward-looking standards, to advance the development and productive use of information technology. To overcome barriers to usability, scalability, interoperability, and security in information systems and networks, ITL programs focus on a broad range of networking, security, and advanced information technologies, as well as the mathematical, statistical, and computational sciences. This Special Publication 500-series reports on ITL's research in tests and test methods for information technology, and its collaborative activities with industry, government, and academic organizations.

A Quick-Reference List of
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The field of digital rights management (*DRM*), sometimes called intellectual property management and protection (*IPMP*), is today a chaotic and not always workable mix of technology, policy, law and business practice.[1] There are many organizations active in DRM. Under such circumstances, even a modest guide or index of active organizations can be useful. In March 2002, experts at a NIST cross-industry DRM workshop recommended that NIST take first steps toward such a guide. With the help of numerous workshop participants and others, this is the first edition of a DRM quick-reference list.

About the Listings. The list has definite tradeoffs to preserve compactness and to limit maintenance. For example, the text contains many secondary-level acronyms that are left undefined—a reader must resolve these terms via Web searching or similar external referencing. Additionally, entries are placed, dictionary style, in alphabetical order rather than under topics. Entries in the table largely constitute an attempt to assemble a *short set of descriptions* about organizations in DRM (who they are, what they are doing)[2]. The left side of each entry is a descriptor. The entry right side—somewhat *ad hoc* in layout—supplements by helping a reader explore further, usually at some Web site of an organization[3]. Comments on earlier drafts indicate this format strikes reasonable balance for readers from the March workshop—entries convey information, yet overall, the list does not span too many pages.

Quick-Reference List

3GPP and 3GPP2 Third generation wireless systems transmit broadband, packet-based text, digitized voice, video, and multimedia at rates *circa* two megabits per second. The *Third Generation Partnership Project* is a collaboration and harmonization effort among telecommunications standards bodies; the current set has ARIB, CWTS, ETSI, T1, TTA, and TTC. Project 2 (*3GPP2*) does not include ETSI.	**DRM standards, coordinations, interests:** Major alliances: Cf. www.3gpp.org/Management/OP.htm Observers— ACIF, TIA, TSACC Liaisons—Wireless Multimedia Forum (WMF) **Membership:** Telecommunication standards bodies may be Organizational or Observer Partners. Other statuses described at http://www.3gpp.org/membership/membership.htm. **See:** http://www.3gpp.org/ and also http://www.3gpp2.org/ **Remarks:** 3GPP's TSG-SA (WG4) is responsible for Technical Specifications for Service and Applications, with WG4 concerned with DRM issues as related to wireless services.
4C Entity *4C Entity* licenses three DRM technologies—Content Protection for Prerecorded Media (CPPM), Content Protection for Recordable Media (CPRM), and the C2 Encryption Technology.	**Major alliances:** Cf. *CPTWG* entry. **See:** http://www.4centity.com/ **Remarks:** Currently, CPPM covers prerecorded DVD Audio and CPRM applies to recordable, removable media (DVD-R, -RW, -RAM, + two flash memory cards). 4C Entity offers C2 Encryption Technology, used for both CPPM and CPRM, independently for content on various media, removable or non-removable. The website also has information on the Content Protection System Architecture (CPSA) and on watermark application. CPSA is a conceptual framework for the integration of otherwise-independent content protection technologies (including CPPM and CPRM).

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[1] The list entry "DRM" briefly sketches some of the property management and protection roles.

[2] Special thanks go to F. Attaway, M. Baugher, T. Dow, C. Garza, W. Hanniball, T. Hardjona, M. Hogan, V. McCrary, T. Rhodes, P. Schneck, R. Snelick, J. Thurston and B. Turnbull for inputs, suggestions and corrections to earlier drafts.

[3] Hyperlinks cannot be guaranteed. In a fast moving field such as DRM, the lifetime of some Web links has been short.

5C	Cf. *DTLA* entry.
AAP The *Association of American Publishers, Inc.* has developed standard requirements for publishers in the field of electronic books (e-books) and metadata for the electronic marketing of conventional books.	**DRM standards, coordinations, interests:** Major alliances: • EDI*t*EUR (which see) • BISG (*Book Industry Study Group*, which see) Efforts developed with participation from the publishing and e-commerce industries. Has 310 company members. **Membership:** A system of regular, associate and affiliate tiers with dues based upon sales in the field of publishing. U.S. Companies are specified. **See:** http://www.publishers.org/, and especially Digital Rights Management for Ebooks: Publisher Requirements, available at http://www.publishers.org/home/drm.pdf **Remarks:** Defined requirements are voluntary and open standards.
ATSC The *Advanced Television Systems Committee*, Inc. is an international, non-profit membership organization developing voluntary standards for the entire spectrum of advanced television systems. Specific ATSC focuses are digital television, interactive systems, and broadband multimedia communications. ATSC has defined the digital TV standard for the U.S.	**DRM standards, coordinations, interests:** Major alliances: Key organizations contributing to the development of digital television and to the ATSC DTV Standard include the U.S. Congress and FCC, the FCC's Advisory Committee, the Digital HDTV Grand Alliance, and the ITU-R. Other liaisons— **Membership:** http://www.atsc.org/membership.html gives details. Open to corporations, non-profits and government on a sliding membership fees scale. **See:** http://www.atsc.org/ **Remarks:** DVB is the European equivalent undertaking (see below).
BASIC *Book And Serial Industry Communications* is a standards forum of BISG (see below). BASIC develops and maintains technology and electronic commerce standards.	**See:** http://www.bisg.org/basic.htm **Remarks:** Facilitates administration of electronic data interchange (EDI) formats for books and serials. Uses international EDI standards coordinated by EDItEUR, the international organization coordinating book and serial electronic commerce.
BIC The UK-based *Book Industry Communication* develops standards for e-commerce and communication in the book industry. BIC has three major focuses: bibliographic and EDI standards, the supply chain, and digital publishing.	**DRM standards, coordinations, interests:** Major alliances: EDI*t*EUR, BISG **Sponsors:** The Publishers Assoc., The Booksellers Assoc., The Library Assoc., and the British Library. **See:** http://www.bic.org.uk/ **Remarks:** See ONIX entry.
BISG The *Book Industry Study Group* is spearheading the management of the On-Line Information Exchange (ONIX) and promoting the standardization of e-content and ONIX tagging for the better dissemination of electronic matter.	**DRM standards, coordinations, interests:** Major alliances: AAP, EDItEUR, BIC Other liaisons— **Membership:** Five tiers, with fees ranging from $500 to $6000 per year: university, non-profit, library, associate and commercial. **See:** http://www.bisg.org/ **Remarks:** See ONIX entry.
BPDG Broadcast Protection Discussion Group, a sub-group of CPTWG.	**Cf.** CPTWG entry. **Remarks:** Trying to resolve retransmission issues (esp. Internet retransmission) on DTV.

CDN	**A term** signifying *Content Distribution Network.* May designate an electronic infrastructure for materials (including streams) that have digital rights or intellectual property management (DRM/IPM) requirements. CDN issues include security, efficient storage including caching, availability and quality of service.
CEN/ISSS *Comité Européen de Normalisation* develops European technical standards. Experts work through Technical Committees (TCs), of which eight—all IT related—are in the Information Society Standardization System. ISSS aims for rapid market-driven informal specification plus the security of conventional, formal, open standardization. New, special DRM project examines standardization of technologies for digital rights management.	**DRM standards, coordinations, interests:** Recent ISSS draft DRM report widely circulated, see europa.eu.int/information. In March 2002, began an inventory of DRM standards work on sector, status, membership, schedules, process, activity, outputs, etc. Follow the link http://www.cenorm.be/isss/Projects/DRM/NEW_WEB_SITE_Revised.htm **Membership:** The DRM Group is open to any CEN/ISSS Forum member entity, or their representative, and to additional interested parties. **See:** http://www.cenorm.be/isss/ **Contacts:** giulia.cipressi@cenorm.be, James.Boyd@cenorm.be **Remarks:** CEN/ISSS represents the European Union at the international level, e.g. ISO.
cIDF Like the DOI (below) , the *content ID Forum* develops specifications for content identification and metadata that enable e-commerce and rights transactions for copyrighted information. cIDF and DOI have agreed to collaborate on building an infrastructure for the management of digital intellectual property.	**DRM standards, coordinations, interests:** **Partners:** ISO/MPEG, Indecs, IDF (DOI), TV Anytime Forum, DCForum, AMF, MAA, DCAj, AMD, CG-Arts Assoc., ARIB **See:** http://www.cidf.org/ **Remarks:** Established by Prof. H. Yasuda at the University of Tokyo. Provides mechanisms for copyright management, cooperates with other standardization bodies throughout the world.
CPTWG The *Copy Protection Technical Working Group* is an *ad hoc* public forum for discussing content protection technologies that inhibit access, use, or reproduction not authorized by copyright owners; CPTWG's meetings are attended by companies in the industries of content (esp. video and audio), consumer electronics, information technology, copy protection, and, by consumer interest groups.	**DRM standards, coordinations, interests:** **Formal:** The Broadcast Protection Discussion Group (BPDG) is a discussion group created by the CPTWG. **Interactions**—See http://www.cptwg.org/html/LINKSPAGE.htm; also see entries for DVD CCA/CSS, 4C, DVD Forum, HDCP, DVD+RW Alliance. **Membership:** Formed by CEA, MPAA and the Information Technology Industries Council (ITI), with further support from RIAA and BSA **See:** http://www.cptwg.org/ **Remarks:** Presentations are made by vendors and experts. Discussion groups form to provide more in-depth review of particular issues when that is desired by the participants. Meetings are public forums held at the Renaissance Hotel, 9620 Airport Blvd., Los Angeles, CA (at airport).
DCMI (Dublin Core) The *Dublin Core Metadata Initiative* is an open forum engaged in the development of interoperable online metadata standards that support a broad range of purposes and business models. This metadata work originates in describing bibliographic information for library publications.	**DRM standards, coordinations, interests:** Major alliances—See www.dublincore.org/about/participants/ for details. National library systems, etc. Other liaisons— CEN, IEEE/LOM, IETF, MPEG, NISO, W3C, PRISM; see http://www.dublincore.org/about/liaisons/ **Membership:** Open—participate by joining the appropriate mailing list for the working group activity of interest. **See:** http://www.dublincore.org/ **Remarks:** Standardized in the IETF as RFC 2413

DOI (IDF) The International DOI Foundation states, "The Digital Object Identifier (DOI®) is a system for identifying and exchanging intellectual property in the digital environment. It provides a framework for managing intellectual content, for linking customers with content suppliers, for facilitating electronic commerce, and enabling automated copyright management for all types of media." The DOI is a "persistent identifier of intellectual property entities". Unlike a URL, it does not point to a location. The DOI specification was originally developed by the Corporation for National Research Initiatives based on their "Object Handle" specification.	**DRM standards, coordinations, interests:** Major alliances • WIPO (World Intellectual Property Organization) • ISO (International Standards Organization) • NISO (National Information Standards Org.) • IETF (Internet Engineering Task Force) • W3C (World Wide Web consortium) • OEBF/EBX (Electronic Book Exchange) • MPEG-21 (ISO Multimedia Framework—see entry MPEG) Other liaisons— CENDI, CIDF,CNRI, EDItEUR, ICE, <indecs>, XBRL; *cf.* 8.0 of DOI Handbook at www.doi.org/handbook_2000 **Membership:** Open to those interested in electronic publishing and related technologies. Non-members welcome to contribute. **See:** http://www.doi.org/ **Remarks:** Work is evolving rapidly.
DMCA World Intellectual Property Organization (WIPO) treaties gave impetus to U.S. legislation called the *Digital Millennium Copyright Act* of 1998. To facilitate digital, e-commerce growth, Congress implemented legislation that addresses WIPO treaty obligations not adequately addressed under existing U.S. law.	**Origin:** U.S. Congress "…But as Congress recognized, the only thing that remains constant is change. The enactment of the DMCA was only the beginning of an ongoing evaluation by Congress on the relationship between technological change and U.S. copyright law. This Report of the Register of Copyrights was mandated in the DMCA to assist Congress in that continuing process…." *From* www.loc.gov/copyright/reports/studies/dmca/dmca_executive.html **Level of controversy:** Very high, both nationally and internationally
DTLA, (5C DTLA) The *Digital Transmission Licensing Administrator* handles matters on the use of the DTCP (digital transmission content protection) method, which is licensed. DTCP details are available through the DTLA via terms of a nondisclosure agreement.	**DRM standards, coordinations, interests:** Major alliances—5C=(Intel, Toshiba, Sony, Hitachi, Panasonic). Other liaisons—CPTWG (which see) **Membership:** **See:** http://www.dtcp.com/ **Remarks:** Content protection particularly aimed at transport on high performance digital buses.
DREL	*Cf. IEEE/LOM* remarks.
DRM *Digital Rights Management* is a system of information technology (IT) components and services, along with corresponding law, policies and business models, which strive to distribute and control intellectual property and its rights. Product authenticity, user charges, terms-of-use and expiration of rights are typical concerns of DRM.	For a generic DRM transaction, imagine A gets a request to send digital material X to B. The digital content X is typically combined by producer A with tracing information, giving $(X + t)$. This tagged content is then encrypted along with rights-rules (RR) and user/document identifiers (ids) to yield $e(X +t +RR + ids)$. A sends this result, $e(...)$, to B. B has a compatible receiving environment, sometimes a special tamper-resistant reader, in which $e(...)$ can be properly decrypted and used. The key to $e(...)$ may be sent encrypted with B's public key if there is one; B (and only B) then uses its private key to decode the message key. A third-party clearinghouse H receives and sends payments, logs trace information and controls authorizations to A and B as appropriate.

DVB The *Digital Video Broadcast* project is an international industrial consortium of broadcasters, electronics manufacturers, network operators, software concerns and regulatory bodies. DVB is committed to designing European standards for the delivery of digital television and data services.	**DRM standards, coordinations, interests:** Major alliances: MPEG **Membership:** Cost = 10K euros ($9.2K) and member's activities should fit one category—broadcasters, network operators, regulatory bodies, manufacturers/developers, or, academic institution. **See:** http://www.dvb.org/ **Remarks:** Uses MPEG-2 packets as information payload containers. Supplies critical Service Information with packets. See ATSC for North American equivalent. CP and CPT—copy protection and CP (technical)—are DVB ad-hoc groups. Status of IPRM (the intellectual property rights module?) is unclear. ATSC (see entry) is North American equivalent effort.
DVD+RW Alliance This alliance comprises PC manufacturers, storage vendors and electronics manufacturers.	**DRM standards, coordinations, interests:** Major alliances Other liaisons—Cf. CPTWG **Membership:** http://www.dvdrw.com/join.html **See:** http://www.dvdrw.com/ **Remarks:** There is no membership fee or contract. Membership includes developing DVD+RW products within specific time windows (a year or so).
DVD Forum The *DVD Forum*—an international association of hardware manufacturers, software firms and other users of Digital Versatile Discs—exchanges and disseminations ideas and information about the DVD format. The Forum works to promote broad acceptance of DVD products on a worldwide basis, across entertainment, consumer electronics and IT industries.	**DRM standards, coordinations, interests:** Other liaisons—CPTWG **Membership: O**pen to corporations or organizations linked to DVD research, development or manufacturing, or software firms and other users of DVD products interested in improving the DVD Format. **See:** http://www.dvdforum.org/ **Remarks:** Promotes broad acceptance of DVD products worldwide, across entertainment, consumer electronics and IT industries. Membership exceeds 230 companies.
DVD CCA/CSS *DVD Copy Control Association* is a not-for-profit corporation with responsibility for licensing CSS (*Content Scramble System*) to manufacturers of DVD-related products.	**DRM standards, coordinations, interests:** **See:** http://www.dvdcca.org/ **Remarks:** See CPTWG, above.
EBNA "The *E-Book Newsstand Association* serves as the meeting place for companies active or interested in the delivery of periodical information to consumers or business customers via Electronic Books, Personal Digital Assistants, or Electronic Paper." *from Website*	**DRM standards, coordinations, interests:** Major alliances Other liaisons— **Membership:** Relatively inexpensive; open to companies and individuals. **See:** http://www.ebna.org/ **Remarks:** E-publishing is a representative class of users from DRM technologies and services.
ebXML ebXML is an international effort by The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) and the Organization for the Advancement of Structured Information Standards (OASIS), which have joined forces to initiate a worldwide project to standardize XML business specifications.	**DRM coordination, interests:** Major alliances—UN/CEFACT and OASIS (see entry for *OASIS*) **See:** http://www.unece.org/cefact/, http://www.oasis-open.org/, http://www.ebxml.org/ **Remarks:** Competing efforts worldwide to define XML for global business exchanges has triggered this work, which addresses harmonization of electronic business formulations.

EDI*t*EUR *EDItEUR* is the pan-European book sector EDI Group. An British-incorporated company, it co-ordinates development, promotion and implementation of electronic commerce in the book and serials sectors.	**DRM standards, coordinations, interests:** Major alliances: Recognized by the Commission of the European Union and by the Western European EDIFACT Board; supported by the European Federations of Library, Booksellers and Publishers Associations Other liaisons— International, with 90 members from 17 countries **Membership:** Open to enterprises with interests in EDI for the book trade, and, to related associations **See:** http://www.editeur.org **Remarks:** See *ONIX*. Refer to www.editeur.org/ddd2_01.doc for the related EPICS data dictionary.
EPICS/ONIX *EPICS* refers to a comprehensive data dictionary developed by EDI*t*EUR (see entry, above) and incorporated into the ONIX effort.	**Comment:** EDI*t*EUR maintains the EPiCS/ONIX family of standards; the family addresses the electronic use of information on book products. Also, see *ONIX*.
HDCP *High-bandwidth Digital Content Protection* is a specification developed by Intel Corporation to protect digital entertainment content across the DVI interface.	**DRM coordinations, interests:** Confer entry for *CPTWG*. **See:** http://www.digital-cp.com/ **Remarks:** HDCP specification implementation requires a license.
ICE The *Information and Content Exchange* is a protocol and management model for information reuse among Web sites—syndication. It promotes automated data transfer and management of results.	**DRM standards, coordinations, interests:** Major alliances • PRISM—Syndication (e.g. between Web sites) requires a common vocabulary. PRISM can describe ICE items, and, ICE can convey PRISM descriptions. Other liaisons— W3C **Membership:** Open, modest yearly charge. 25% discount for Int. Digital Enterprise Alliance members. Authoring Group membership fee is 10x higher. **See:** www.icestandard.org and http://www.w3.org/TR/NOTE-ice **Remarks:** Section 1.2 of note at www.w3.org/TR/NOTE-ice gives good number of details on relationships to other standards.
IDF International DOI Foundation.	**See:** Entry for "DOI."
IEEE/LOM The *IEEE* P1484.12 *Learning Object Metadata* Working Group specifies syntax and semantics of Learning Object Metadata—attributes that describe entities used during technology-supported learning. LOM is one of several working groups of the parent standards group, the IEEE Learning Technology Standards Committee.	**DRM standards, liaisons, interests:** Prometeus MoU: http://prometeus.org ; The IMS Project: http://www.imsproject.org; The Ariadne Project: http://ariadne.unil.ch ;European Schoolnet: http://www.en.eun.org ; IEEE/LTSC: http://grouper.ieee.org/groups/ltsc ; Virtual European School: http://www.ves.eu.org ; CEN/ISSS WS/MMI-DC ; ISO/IEC JTC1/SC36:http://www.jtc1sc36.org **Membership:** Open, dues $200/year. **See:** http://ltsc.ieee.org/wg12/s_p.html **Remarks:** Learning Objects include, *e.g.,* multimedia content, instructional materials, software and tools. Co-sponsors workshops on Rights Expression Language (DREL), see http://www.cenorm.be/isss/Workshop/LT/digit-rights/Default.htm
IETF The *Internet Engineering Task Force* has no specialized DRM group, but it does have group key management efforts such as GDOI (*Group Domain of Interpretation Rekey protocol*) and MIKEY (*Multimedia Internet KEYing*) within its MSEC Working Group.	**DRM standards, coordinations, interests:** Major alliances: W3C (Cf. *XKMS* entry) Other liaisons— IRTF (GSEC Working Group) **Membership:** **O**pen to any interested individual w/out charge. **See:** http://www.ietf.org/ **Remarks**: Key management standards needed for DRM.

IFPI	**DRM standards, coordinations, interests:**
IFPI represents the international recording industry: It fights music piracy, promotes fair market access and adequate copyright laws, helps develop legal conditions and technologies for industry in this digital era, and promotes music as an economic factor in addition to its social and cultural contributions.	Major alliances: IFPI works with its 46 national groups through international and regional offices Other liaisons—Closely affiliated with the RIAA (http://www.riaa.org/). **Membership:** Entity or person producing sound recordings or music videos available publicly in reasonable quantities. **See:** http://www.ifpi.org/ **Remarks:** A part of DRM involves interdiction, i.e., getting local authorities to enforce information protection laws against piracy. IFPI places heavy emphasis upon this aspect (see Web pages).
INDECS INDECS is an international initiative of rights owners creating metadata standards for e-commerce. <in*d*ecs>™ stands for **in**teroperability of **d**ata in **e-commerce s**ystems—it stresses structured metadata and data dictionary for interoperability. <in*d*ecs>™ Framework Ltd is a not-for-profit company encouraging well-formed metadata initiatives based on <in*d*ecs> methods. The project is supported under European Commission info2000 that embraces multimedia rights clearance systems (MMRCS).	**DRM standards, coordinations, interests:** Major alliances ALCS (Authors' Licensing and Collecting Society Limited) www.alcs.co.uk MCOS (UK, musical works, Composer/publisher societies) BILD-KUNST (Germany, visual arts, creator's society) SACD (France, audiovisual and visual arts, creator's society) IFPI (International/UK-based, sound recordings, trade association) EDItEUR (European/UK-based, book/serial/electronic publishers/libraries) KOPIOSTO (Finland) (Co-ordinating Partner) CEDAR (Netherlands) CAL (Australia) MUZE UK (UK subsidiary with MUZE US parent) Other liaisons— Many. See http://www.indecs.org/project/affiliates.htm **Membership:** Partnership (cf. *alliances*, above) **See:** http://www.indecs.org/ **Remarks:** Affiliates include US Copyright Office, RIAA
INDECS2 <indecs2> is a follow-on project to create a rights data dictionary (RDD) spurred by requirements of MPEG-21 for a "consistent, ordered and machine-readable set of semantics … describing the rights in intellectual property … for permissions, such as 'print', 'copy', or 'play', to be reliably and securely controlled for all information in digital form, online and offline."	**DRM standards, coordinations, interests:** Major alliances—EDItEUR/ONIX, Int. DOI Foundation, RIAA/IFPI, MPA, Accenture, XrML (ContentGuard), Dentsu, Enpia are consortium partners. Other liaisons—XML, WIPO, MPEG(21) **Membership:** Partners **See:** **Remarks:** Responding to MPEG call using ISO/MPEG process; DOI dictionary as input; DOI developments will use output.
IPTC--NewsML The International Press Telecommunications Council has two specifications for news (see NITF, below). NewsML supports automated *transmission* of news stories and wire services. It is an XML-based standard to represent and manage *multi-media* news throughout its lifecycle, including production, interchange, and consumer use.	**DRM standards, coordinations, interests:** Major alliances • with PRISM on common format and metadata vocabulary • XML Other liaisons—Use appropriate standards and recommendations. **Membership:** An independent international association of the world's leading news agencies and publishers. **See:** http://www.newsml.org/ **Remarks:** PRISM, NewsML "largely complementary." PRISM vocabularies can be used in NewsML. To replace IIM. Extensible and flexible. Use NITF for text with NEWSML. Plug-in NewsML parser available for browsers.

IPTC--NITF	DRM standards, coordinations, interests:
The IPTC also has an XML DTD (grammar) specification for news mark up. Called NITF for *News Industry Text Format*, it uses the eXtensible Markup Language (XML) to *define the content* and structure of news articles. With embedded metadata, NITF documents are far more searchable and useful than HTML pages.	Major alliances • work with PRISM Other liaisons— **Membership:** An independent international association of the world's leading news agencies and publishers. **See:** http://www.nitf.org/ **Remarks:** PRISM group says "largely" complements their specification. NITF documents translate into HTML, WML (wireless devices), RTF (for printing), etc. State "it is a standard that is open, public, proven, well-used, well-documented, and well-supported."
IRTF/IDRM *Internet Research Task Force/Internet Digital Rights Management* group examines new information rights technologies that impact the Internet. Seeks intellectual property network protocols and mechanisms that interoperate. Examples: directories, trust, privacy, policy, transport and security services.	**DRM standards, coordinations, interests:** DOI; <indecs>; MPEG/MPEG4 IPMP; W3C DRM 2001 Workshop www.w3.org/2000/12/drm-ws/SDMI; XrML; ISMA; ODRL; XACML OASIS; MSEC/(GDOI and MIKEY) IETF working group covers key dissemination needed for DRM http://www.securemulticast.org/msec-meetings.htm. **Membership**: open **See:** http://www.idrm.org/ for informative Web site **Remarks:** IRTF research complements engineering of IETF. Coordinates with IETF, other IRTF groups, to spot missing technology, recommend technical standards, etc. Note: Group charter revision underway, name change likely from IDRM.
IRML	See remarks portion of *XBML*.
ISMA As standard XML based mark-up languages have fueled innovation and growth of today's Web, so strives the *Internet Streaming Media Alliance* to accomplish the same for the next wave of rich Internet content, streaming video and audio.	**DRM standards, coordinations, interests:** Major alliances: 35+ corporate entities have joined. Other liaisons— **Membership:** See http://ism-alliance.tv/html/join/indexjoin.shtml for costs of joining. **See:** http://ism-alliance.tv/ **Remarks:** The first specification from ISMA defines an implementation agreement for streaming MPEG-4 video and audio over IP networks. On-going work includes adopting methods for digital rights management (DRM), quality of service (QoS) and related technologies.
ITU-T The *International Telecommunications Union* is an organization within the United Nations system.	**See:** http://www.itu.int/ **Remarks:** ITU-T recommendations developed by the Telecommunication Standardization Sector (formerly CCITT) constitute the basis for international telecommunication standards.
MIME *Multipurpose Internet Mail Extensions* specifies formatting for non-ASCII messages for transmission over the Internet. Graphics, audio, and video files via the Internet mail system. In addition, MIME supports messages in character sets other than ASCII.	**Remarks:** Defined in 1992 by the Internet Engineering Task Force (IETF—see *IRTF* "remarks"). The newer S/MIME, supports encrypted messages. Has types, e.g., GIF for graphics files and PostScript for formatted files. It is also possible to define your own MIME types.

MPEG The *Moving Picture Experts Group* is an ISO/IEC working group for standards development of coded representation of digital audio and video. MPEG has a series of specifications promoting content interoperability pertinent to DRM: MPEG-2 A/V content for DVD and TV. MPEG-4 multimedia content representation (metadata). MPEG-4 IPMP (intellectual property management and protection) addresses connected appliances, with work on standalone progressing. MPEG-7 is content description (complements MPEG-4). MPEG-21 is a sweeping, ambitious framework for interoperable digital multimedia, transparent in use, user-friendly in practice. MPEG Rights Expression Language (MPEG REL) and MPEG Rights Data Dictionary (MPEG RDD) currently under development. MPEG REL based on XrML and the MPEG RDD based on the <indecs2> RDD.	**DRM standards, coordinations, interests:** • ISMA (Internet Streaming Media Alliance) uses MPEG-4 • ITU-T/MPEG video coding work for MPEG-4 • IRTF/IDRM • W3C is interested in MPEG work, but thus far (5/02) reticent to pursue DRM. • XML, e.g., in MPEG-21 Digital Item Description--DID, also XrML and ODRL (both XML-based digital rights languages) submitted to MPEG-21 responding to Call for Proposals for Rights Expression Language. • Annex C (pp. 38-45) of report ISO/IEC 21000-1 points to many places of possible collaboration: http://www.tele.ntnu.no/users/andrew/Papers/MPEG-21-Part-1.pdf **Membership:** Requires accreditation by a National Standards Body or standards committee in liaison. Experts attending MPEG not representing a committee in liaison must be members of a National Delegation under the responsibility of a Head of Delegation appointed by the National Body. **See:** http://mpeg.telecomitalialab.com/ **Remarks:** Note that *DRM = IPMP* in MPEG parlance.
MMS 3GPP has defined a *Multimedia Messaging Service* that supports mobile user transactions via messages containing multimedia elements.	**See:** 3GPP entry, above. **Remarks**: MMS builds on SMS (Short Message Service). It makes Internet/mobile phone messaging much richer, exchanging text, graphics, audio, photographic images and video clips between mobile devices. MMS is not, however, real-time.
NewsML, *News Markup Language*	**See** XBRL entry, "Remarks."
OASIS *Organization for the Advancement of Structured Information Standards* is a not-for-profit, international consortium that designs and develops e-commerce standard interoperability specifications using XML [see XML entry] as a basis.	**See:** http://www.oasis-open.org/ **Remarks:** Together, OASIS and the United Nations sponsor ebXML, which is a framework for e-business data exchange. The consortium also operates XML.org, a clearinghouse for application schemas, vocabularies and related XML documents.
OASIS XACML The OASIS *eXtensible Access Control Markup Language,* XACML, is an XML specification for expressing policies for information access over the Internet. Issues to be addressed include fine-grained control, requestor characteristics, protocols over which requests are made, and types of activities authorized.	**DRM standards, coordinations, interests:** Major alliances: W3C, IETF, UN/CEFACT Other liaisons—Several efforts involving XML and electronic security are deemed germane to XACML and have liaisons to help ensure interoperability and to avoid duplication of work: - ebXML—e-business application of XML , - XKMS—distribution/registration of public keys, - DSML— directory information in XML **Membership: Open in three levels of participation:** sponsor, contributor, and individual. Details at http://www.oasis-open.org/join/ **See:** http://www.oasis-open.org/ **Remarks:** XACML defines a core schema and corresponding namespace for the expression of authorization policies in XML against objects that are themselves identified in XML.

OASIS RLTC—Rights Language Technical Committee The purpose of the *Rights Language TC* is to define the industry standard for a digital rights language that supports a wide variety of business models and has an architecture that provides the flexibility to address the needs of the diverse communities that have recognized the need for a rights language. Work is based on XrML submission from ContentGuard (see MPEG for other work based on XrML). See also the entry, below, for ODRL, an alternative rights language.	**DRM Standards, Coordinations, interests:** This TC will continue to develop and act as the governance body for XrML, the eXtensible Rights Mark-up Language. This effort includes the XML 1.0 Specification, XML Schema, Namespaces in XML, Uniform Resource Identifiers (URI): Generic Syntax, Digital Object Identifier (DOI), ISO 3166 Codes for representing names of countries, ISO 4217 Codes for representing currencies and funds, XML Path Language (XPath) Version 1.0 XrML supports and may utilize additional industry standards: Dublin Core Metadata Initiative, Resource Description Framework (RDF), Universal Description, Discovery and Integration (UDDI), Web Services Definition Language (WSDL), XML-Encryption Syntax and Processing, XML-Signature Syntax and Processing **See:** http://www.oasis-open.org/committees/rights/ ; http://www.xrml.org/
OASIS SAML The *Security Assertion Markup Language* (SAML) is being developed by the OASIS XML-Based Security Services Technical Committee (SSTC).	**See:** http://www.oasis-open.org/committees/security/ - documents **Remarks:** The Security Assertion Markup Language (SAML) is an XML-based framework for exchanging security information expressed in the form of assertions about subjects.
OASIS WSIA TC The OASIS *Web Services for Interactive Applications* (WSIA) TC is developing a Web-services component model for interactive applications.	**See:** http://www.oasis-open.org/committees/wsia/ - charter **Remarks:** The primary deliverable is a matched set of XML vocabularies and Web Services interfaces that will deliver web applications via diverse channels and create web applications that can be easily changed via simple declarative means.. .
ODRL The *Open Digital Rights Language* provides semantics for a digital rights management expression language and data dictionary. ODRL pertains to digital content in all forms: it expresses terms and conditions— permissions, constraints, obligations, conditions, offers and agreements with rights holders. ODRL is designed for extension by different industry sectors (eg ebooks, audio, software) while retaining a core of inter-operability. ODRL is freely available: There are no licensing requirements.	**DRM standards, coordinations, interests:** Major alliances • **ODRL** supports MPEG-21. It will be a compatible Rights Language supporting open and free interoperability within and across the MPEG-21 Multimedia Framework. • **HTML** and **XML** bases • [Sept. 2002] **W3C** has the *Open Digital Rights Language (ODRL) Version 1.1* specification, published as a W3C Note. However, the chartering of a DRM/Rights Language activity remains an open issue within W3C at this time. Other liaisons— Has commercial and academic supporters. **Membership:** http://odrl.net/ **Remarks:** Refer to competitor entries XrML and OASIS RLTC.

OeBF (including EBX) *Open eBook Forum,* an international trade and standards group, welcomes hardware and software companies, publishers, authors, users of electronic books, and related organizations. OeBF provides a forum for the discussing issues and technologies related to electronic books, and, for developing and promoting adoption of common specifications and interoperable standards relating to electronic books.	**DRM standards, coordinations, interests:** Major alliances • BISG (Book Industry Study Group www.bisg.org) • DOI (Digital Object Identifier www.doi.org) • W3C (World Wide Web Consortium www.w3.org) • NISO (National Information Standards Org. www.niso.org) • The Daisy Consortium (www.daisy.org) Other liaisons—AAP, Amer. Fed. Blind **Membership:** Principal Member subscribers have major voting rights. Corporations, organizations and private individuals may also join at nominal cost as non-voting Associate Members, who may, when approved by Working Group chairs, become voting members of Working Groups. **See:** http://www.openebook.org/ = http://www.ebxwg.org/ **Remarks:** EBX is now part of the OpenEBook Forum
OMA The *Open Mobile Alliance*, a new organization begun in June, 2002, seeks to develop the mobile industry by removing barriers to global user adoption and by promoting a high degree of application interoperability.	**DRM standards, coordinations, interests:** Major alliances: OMA is a consolidation of the Open Mobile Architecture initiative and the WAP Forum. Other liaisons: Location Interoperability Forum (LIF), SyncML, MMS Interoperability Group (MMS-IOP), and Wireless Village **Membership:** 200+ corporations and other interested parties. Fees run from $500 to $200,000 per year. **See:** http://www.openmobilealliance.org/ **Remarks:** Subsumes WAP Forum, among others. OMA wants to address interoperability issues while "allowing businesses to compete through innovation and differentiation" [from the Web site].
ONIX International The *Online Information eXchange* is a standard format used to distribute information about books electronically. The rich ONIX metadata (may have audio or video) replaces the information on the jacket cover. ONIX is a standard format for easy, automated use in the Web-supported supply chain by a variety of book wholesalers, retailers, and others.	**DRM standards, coordinations, interests:** Major alliances: AAP, EDItEUR, BISG, BIC Other liaisons: BASIC (Book And Serials Ind. Communications) **Membership:** Typical committee members include American Booksellers Assoc., AAP, AAUP, AWBA, Amazon, Barnes & Noble **See:** www.editeur.org (Europe), www.bisg.org (US), www.bic.org.uk (UK) **Remarks:** Future issues include provision for e-books, videos and for DRM elements. Based on the ubiquitous XML with an ONIX DTD (document type definition). Major on-line booksellers use it.
PRISM *Publishing Requirements for Industry Standard Metadata* specification—is an extensible XML metadata standard for syndicating, aggregating, and generally, multi-targeting content for the printed medium. It supports interoperable content description, interchange, and reuse. Applications can be implemented without fees, but they must not modify PRISM namespaces and vocabularies. Unlike XrML, assumes in-place business arrangement. Aims at inexpensive use.	**DRM standards, coordinations, interests:** Major alliances • IPTC-NEWSML complements and overlaps PRISM; groups coordinate • PRISM recommends XML, RDF, the Dublin Core, and various ISO specifications for locations, languages, and date/time formats. • Beyond the above, it defines a small number of XML namespaces and controlled vocabularies of values. **See:** http://www.prismstandard.org/techdev/prismspec1.asp **Remarks:** A simplified application of RDF (see below), but compatible. Uses Dublin Core vocabulary. Complements ICE. Complements, overlaps NITF from IPTC. Can use MIME for metadata packaging. Refer to http://www.oasis-open.org/cover/prism.html.
RDF The W3C *Resource Description Framework* model uses XML to represent and transport metadata—can describe web resources (content, services, etc.).	**See:** remarks in W3C entry **Remarks:** PRISM (cf. above) uses a simplified resource description framework (RDF).
RIXML	See remarks for entry *XBRL*.

SAML	See entry *OASIS XML-Based Security Services Technical Committee (SSTC).*
SDMI The **Secure Digital Music Initiative** comprises roughly 150 participants representing a spectrum of information technology companies and allied music interests. SDMI's charter has been to develop open technology specifications that protect the playing, storing, and distributing of digital music so that a new market for digital music can emerge. SDMI has aimed at: • Providing convenient access to music online and via novel advent digital distribution • Assuring copyright protection for artistic works • Promoting development of new, music-related business and technology	**DRM standards, coordinations, interests:** Major alliances—150 participants. Other liaisons— see Membership, below. **Membership:** Open to technology-based commercial companies having significant direct effect on digital music security. Societies and associations representing music industry interests who are members of the Music Industry Advisory Council may participate as observers. **See:** http://www.sdmi.org/ **Remarks:** SDMI has lacked sufficient technology to assure its requirements. Quoting text dated May 18, 2001, from the SDMI Website, "… SDMI is now on hiatus, and intends to re-assess technological advances at some later date. This decision does not affect the prior adoption of SDMI's portable device specification and Phase I watermark, which are in widespread use today."
SMPTE (DC28.4) The *Society of Motion Picture and Television Engineers* has a Technical Committee on Digital Cinema (DC28). In particular, DC28.4 works on specifications for security and rights related to digital cinema.	**Website:** see http://www.smpte.org/
SSTC	See *OASIS SAML.*
TV Anytime Forum The *TV-Anytime Forum* has member organizations that seek development of specifications to enable audio-visual and related services using local storage on mass-market,high volume consumer platforms.	**DRM interests:** Work is network independent and stresses interoperability. Delivery mechanisms can be ATSC, DVB and others. Security structures aim at protecting interests of all in chain of delivery. **Membership:** http://www.tv-anytime.org/ **Remarks:** Formed September 1999. It has started on open specifications designed to allow applications to exploit local persistent storage. Working groups are (i) business models, (ii) system, transport interfaces and content referencing, (iii) metadata, (iv) rights managements and protection.
W3C The *World Wide Web Consortium's* Technology and Society Domain held a workshop on DRM in January, 2001. However, domain participants have been slow to join any DRM effort, with many apparently content to have MPEG and others pursue the complex topic.	**DRM standards, coordinations, interests:** • W3C Workshop on Digital Rights Management for the Web (January 2001) http://www.w3.org/2000/12/drm-ws/ • Cooperation with MPEG highly likely if W3C does DRM work **See:** http://www.w3.org/Help/siteindex. **Remarks:** W3C develops specifications, guidelines, software, and tools that support the World Wide Web: these include the Resource Description Framework—RDF—to represent and transport metadata (www.w3.org/RDF), HTML, and XML.
WAEA The *World Airline Entertainment Association* has a Technology Committee that includes a Digital Content Management Working Group. At a technical level, the association addresses hardware and content specifications for commercial aircraft.	**DRM standards, coordinations, interests:** Major alliances: airlines, studios, device manufacturers, digital materials labs, service providers. Other liaisons— ARINC, SMPTE, ISMA, MPEG-4 Forum **Membership:** representatives from over 100 airlines and 300 airline suppliers and related companies. Membership fees vary from $350 to $700 per annum. **See:** http://www.waea.org/ **Remarks:** The WAEA has produced a number of open, voluntary standards for entertainment information on aircraft, including DVD content protection (Specification 0598) and video-on-demand file servers (Specification 0395).

WAP Forum Content Download The *Wireless Application Protocol Forum* Ltd. had begun addressing DRM-IPMP issues in *content download*, including authentication, delivery, rights management, logging and billing. The WAP site is now being merged into the Open Mobile Alliance (OMA) site.	**Possible Effort Co-ordinations:** 3GPP, SDMI, ISO/MPEG/IPMP, ODRL, XrML, XMCL **See:** http://www.wapforum.org/ and the replacement site, http://www.openmobilealliance.org/. **Remarks:** OMA site is under construction as of 10 September 2002.
WIPO The *World Intellectual Property Organization*, an agency of the United Nations, promotes the use and protection of intellectual property (IP). It administers 23 international treaties dealing with different aspects of IP protection. There are two IP categories: i. Industrial property—patents, trademarks, etc.. ii. Copyright—novels, poems, films, music, drawings, photographs, sculptures, architectural designs, etc.	**DRM standards, coordinations, interests:** Major alliances: 179 Member States Other liaisons—170 NGO Observers **Membership:** only States may qualify **See:** http://www.wipo.org/ **Remarks:** Budget is $434M p.a. Regarding DRM, the Web site states, "Under its Digital Agenda – a work program for the Organization over the coming years, WIPO is responding to the confluence of the Internet, digital technologies and the intellectual property system. The Organization is formulating, through international discussions and negotiations, appropriate responses that will encourage dissemination and use of intellectual property such as music, films, trade identifiers and knowledge on the Internet, as well as ensure protection of the rights of their creators and owners."
WISA	See entry *OASIS WISA TC.*
WMF The *Wireless Multimedia Forum* claims (or claimed?) to be an international, multi-vendor venue for those developing products, services and information for rich media content for mobile, wireless devices.	**Liaisons**—See entries for *3GPP2, ISMA* **Membership:** Approximately 35(?) hardware vendors, software makers, carriers and content developers. **Requirements:** Working Group interested in market requirements for DRM services.
WS-I *Web Services Interoperability*, WS-I, is an industry initiative to accelerate development and deployment of interoperable Web services across a variety of platforms, applications, and programming languages.	**See:** http://www.ws-i.org/ **Membership:** Founders include Accenture, BEA Systems, Fujitsu Ltd., Hewlett-Packard, IBM, Intel, Microsoft, Oracle, and SAP AG. **Remarks:** "The mission of WS-I will be to provide implementation guidance to support customers deploying Web services, promote consistent and reliable interoperability among Web services, and articulate a common industry vision for Web services." [from the WS-I Web site]
XACML	**See**: entry for *OASIS XACML*.
XBRL The *eXtensible Business Reporting Language* is an open specification that uses XML-based data tags to describe financial statements: XBRL encoded financial information works across automated supply chains.	**DRM standards, coordinations, interests:** The natural constituency is the financial community, but this crosses over into DRM territory. **See:** www.xbrl.org, www.rixml.org **Remarks:** XBRL can be seen as a possible contribution to the reporting and managing aspect of DRM related to finance. Other XML dialects may enter in as well, *e.g.* for investor research, there is RIXML and IRML (the latter stressing conversational use). NewsML, a news data markup specification, is similarly related.
XKMS The *XML Key Management Specification* defines protocols for distributing and registering public keys that are compatible with the XML Signature (XML-SIG) standard work of W3C and IETF and another anticipated standard for XML encryption.	**Support:** W3C, IETF are doing this Other liaisons— IRTF, OASIS (XML) **See:** http://www.w3.org/2001/XKMS/ **Remarks:** DRM will use encryption technology, especially that related to XML. See IETF entry.

XMCL The *eXtensible Media Commerce Language* is an open, XML variant for industry-wide standards in Internet (multi) media commerce. XMCL may simplify deployment and enlarge the market for digital media over the Internet.	**DRM standards:** XMCL Web site states: "RealNetworks intends to submit the XMCL proposal to the appropriate standards organization, and will work with other industry leaders to ensure the initiative evolves into a widely accepted standard." **Membership:** Abril Group, Accenture, Adobe Systems, Anystream, America Online, Artesia Technologies, Avid Technology, Bertelsmann, British Telecom's BTopenworld, Clear Channel, Context Media, EMI Recorded Music, eMotion, IBM, IFILM, InterTrust, MGM, Napster, RealNetworks, Rightsline, Sony Pictures Digital Entertainment, Starz Encore Group, Sun Microsystems, Tiscali, Viant, and Virage **See:** http://www.xmcl.org/ **Remarks:** XMCL standardizes the expression of business rules, and thus, enables content management independent of DRM (IPMP) and host e-commerce infrastructure.
XML The *eXtensible Markup Language* XML is actually a markup language to create other markup languages (and there have been a lot of them thusly crafted). XML is extensible, license-free, platform-independent and well-supported. Its prolixity is usually redeemed by its wide acceptance and flexibility.	**DRM standards, coordinations, interests:** Widespread coordinations: E.g., go to the xml site below and click on "XML in Industry." **Membership: NA** **See:** http://www.xml.org/ **Remarks:** XML is widely used in recent e-commerce designs because structured and labeled data is necessary for the flexible, open-ended automation of information services. Related entries are "X-series" XBRL, XMCL, etc. (see pointers by RIXML, IRML and NewsML). DRM issues at http://xml.coverpages.org/drm.html
XrML *EXtensible rights Markup Language*— XrML— is an XML-based vehicle for digital rights management. It aims at providing a universal method for specifying rights and conditions associated with the use and protection of digital content and services. XrML promotes the creation of open architectures for digital rights management. The developer has confirmed it has submitted XrML to OASIS for long- term development and governance (see OASIS RLTC above).	**DRM standards, coordinations, interests:** Major alliances—a number of large commercial entities support XrML (see XrML Web site). Other liaisons— OASIS, MPEG-21 **Membership: NA** **See:** http://www.xrml.org/ **Remarks:** See entry for ODRL, above. XrML's specification has been submitted to both OASIS and MPEG-21. Discussion at www.xml.org/xml/zapthink/std263.html indicates differences between XrML and PRISM, the latter addressing a much-simplified problem.
XTM Topic Maps *XML Topic Maps* presents ISO Topic Maps in XML. Handles "topics" and their occurrences and associations. Because not all e-text subjects are electronic artifacts, an address must be provided for such a subject, e.g. "George III." An electronic surrogate for the subject is constructed, which (being electronic) can have an address. This surrogate is a *topic*. Every topic acts as an e-link for some subject.	**DRM standards, coordinations, interests:** Major alliances Other liaisons— **Membership:** *TopicMaps.Org* is an independent consortium of parties developing the applicability of the topic map paradigm [ISO13250] to the World Wide Web by leveraging the XML family of specifications **See:** http://www.topicmaps.org/xtm/1.0/ **Remarks:** PRISM uses controlled vocabularies to similar end. See www.topicmaps.org/xtm/1.0/#desc-intro for easy-to-read discussion, including section 2.1, "A Gentle Introduction to Topic Maps."