

Submission of Paul Jessop, Founder, County Analytics Ltd

**In response to
Library of Congress - US Copyright Office
Notice of Inquiry Docket 2013-2
“Technological Upgrades to Registration and Recordation Functions”**

Date: May 20th, 2013

Introduction

Paul Jessop of County Analytics Ltd respectfully submits these comments in response to the Notice of Inquiry (NOI) issued by the Copyright Office on March 22, 2013 concerning Technological Upgrades to Registration and Recordation Functions.

Paul Jessop is a consultant providing services in fields including metadata and media identifiers. His clients include organizations that own, represent or manage rights in content in the US and worldwide. He has wide experience in international standardization and sits on the relevant standards committees for media identifiers in the US, the UK and France. He also participates in the committee of ISO (see details below) that develops standards in this area. He is the Head of the UK Delegation to the parent committee that oversees this work along with numerous library-related standards, and has previously acted as Head of the UK Delegation to the Moving Pictures Expert Group (MPEG).

He was previously Chief Technology Officer at the International Federation of the Phonographic Industry (IFPI) in London and subsequently at the Recording Industry Association of America (RIAA) in Washington DC. In these capacities he supervised numerous projects concerned with rights management and rights exploitation in the recording industry. He was one of the project managers of the Music Industry Integrated Identifiers Project (known as MI3P) which led to the foundation of Digital Data Exchange (DDEX) and continues to represent IFPI to the board of that organization.

He acts as Executive Director of the International ISRC Agency on behalf of IFPI and Executive Director of the US ISRC Agency on behalf of RIAA. He also represents the interests of CISAC, the International Confederation of Societies of Authors and Composers at the registration authorities of the identifiers for musical works (ISWC), audiovisual works (ISAN), textual works (ISTC) and parties (ISNI).

These comments are submitted solely as a personal response to the NOI. Their preparation has not been supported by any client of County Analytics Ltd and they do not represent the views of these clients. County Analytics Ltd has been involved in the preparation of other responses to this NOI but those comments remain the responsibility of the relevant submitter.

Background

The Copyright Office's NOI comes at a timely point in the management of rights in creative works. The shift that has happened in music from retailing of physical product to online services, and which is currently happening in books and movies, has required a massive change in the way that rights owners manage and communicate information about their holdings. Though the timing of the NOI may be driven in part at least by the need to streamline the user interface that the Copyright Office presents to the users of its systems, the opportunity to align these systems with current, emerging and future industry practices is fortuitous.

Particular attention is given here to three of the particular questions asked:

Question 1 on the capabilities of the Copyright Office's portals,
Question 3 on metadata standards and
Question 6 on the integration of third party databases,

although certain issues raised are to some extent applicable to the other questions.

This submission makes specific recommendations but the overall message is as follows: the Copyright Office should study, adopt and promote internationally standardized ways of identifying the things that are stored in its registration systems and internationally standardized ways of communicating information about them.

It further suggests that the Copyright Office should take a role in the development of these standards to ensure that they can contribute to its mission in support of the progress of science.

Frameworks for Understanding Metadata

Though the Copyright Office is, by virtue of its status as part of one of the great libraries of the world, well positioned to be informed about metadata issues, industry practices and library practices can differ in frustrating ways and it is helpful to review the way in which metadata is viewed in industry circles.

In building an understanding of the requirements for the treatment of metadata for content in a world of online services and electronic trading, the Indecs analysis¹ has proved very helpful to several initiatives². The analysis was the deliverable from a project (Interoperability of Data in E-Commerce Systems) funded by the European Commission in 1998 and has proved extremely robust because of its technology-independent approach and broad applicability to different industry structures and business models.

Indecs starts from the model "people make stuff; people use stuff; and (for commerce to take place) people make deals about the stuff" and recognizes the need

for machine-mediated commerce to be possible. Indecs models content in four layers:

- | |
|---|
| <ol style="list-style-type: none">1. Abstractions2. Expressions3. Manifestations4. Items |
|---|

Abstractions exist only in the mind of the creator. Examples include musical compositions and textual works.

Expressions are events – typically a performance. Examples include a music sound recording.

Manifestations are artifacts that contain an encoding of an expression. Examples include books, compact discs and MP3 files.

Items are particular instances of a manifestation. Examples include a book in a store (as distinct from another copy of the same book in another store or in a library) and a copy of an MP3 file on a particular player.

Indecs also proposes several principles of which two are worth stating here:

The principle of *Functional Granularity*: it should be possible to identify an entity whenever it needs to be distinguished. For example, for pricing purposes, the fourth and fifth editions of a book may be regarded as the same (and not require separate identification) but for stock control (or library lending) purposes it may be critical to distinguish them.

The principle of *Designated Authority*: the author of an item of metadata should be securely identified. This suggests that metadata may have different value depending on the authority of its author and further that conflicting metadata assertions may both have value but require some form of reputation management to assess this value.

The combination of (i) a clear understanding of how a particular piece or class of creative content fits into the Indecs model and (ii) the principle of functional granularity has proved invaluable in creating clean and useful schemes for identification. For example, a scheme to identify sound recordings is plainly at the “expression” level and is therefore independent of the format (optical disc, computer file) and the quality level (16 bit, 24 bit) of the manifestation of the recording. This allows reasonably rigid rules to be articulated for the use of these schemes and compliance with these rules to be checked.

It should be noted that although the framework is comprehensive, it is not always economic to implement it fully. There may be no need for a particular layer. For example, there is no apparent need to manage the expression level of books. The abstraction (textual work) seems to give rise directly to multiple manifestations (book editions – paperback, hardback, e-book etc.) without an intermediate expression-level creation. While it might be argued that the typography of the book has this function, if the book and library communities do not need to manage it then the computer science concept of *coercion* can often be used to bridge the missing layer. Treating the missing expression level as the same as the abstraction layer (i.e., coercing the abstraction to be considered as an expression) does no harm so (after careful thought) it can be skipped.

A more recent development of the Indecs analysis is the work of the Linked Content Coalition³. The principal deliverable is a model for rights management (which is beyond the scope of this submission) but another output is a paper on *Principles of Identification*⁴, which builds on Indecs to provide measured but normative recommendations for creation of identifier schemes.

Finally, it is important to distinguish different sorts of metadata according to the use made of it. The following framework was documented in a report⁵ created by the submitter for the World Intellectual Property Organization but came out of discussions with others so no originality is claimed for it. This classifies metadata into four groups: identity management, rights management, indexing and administrative.

Identity management metadata is just enough metadata to define unambiguously the entity being described. It rigorously excludes “nice to have” elements that may be required for real-world applications but do not contribute to the delineation of a particular entity. So for a book, the Identity Management metadata might be (i) Author, (ii) Title, (iii) Publisher and (iv) Date of publication. The name of the publisher serves to distinguish the (say) US and Australian editions which may be published by different companies (and if the user intends these to be grouped together as being the same entity, he is not trying to define a book but rather a textual work – see the Indecs analysis above). Identity management metadata is typically very limited in scope and highly structured.

Rights management metadata is all the information that is needed to ensure that the right remuneration and credit is attributed in the permitted use of a creative work. This data is complex, dynamic and frequently territorial. It is typically quite structured in principle but differences between different aggregators of rights management metadata have made interoperation difficult. Together with identity management metadata it has strong links to Copyright Management Information.⁶

Indexing metadata is essentially everything else that relates to the relevant entity. This includes descriptive, attitudinal, contextual and analytic information. This is the information that search engines rely upon to return useful results to users. It is

often unstructured and proprietary, though structured schemas for it have been created.

Administrative metadata is information about the assertion and registration of metadata, such as the identity of the party asserting that a particular metadata element is valid, the date the assertion was made and whether any registration fees were paid. The information is typically of little interest to the user of metadata unless they are engaged in a reputation management exercise to evaluate the value of a particular assertion or to compare conflicting assertions.

Identifiers for Entities

Using intrinsic metadata to define an entity is a start though it is plagued with problems, not least of which is that it either requires users to adopt a standard way of expressing metadata elements or requires “matching” to accommodate users’ different choices. The classic example is the sound recording made by *Guns N’ Roses* of the Bob Dylan song *Knockin’ on Heaven’s Door*. Differences in capitalization, the use and placement of apostrophes standing for missing characters and possible misplacement or omission of the genitive apostrophe make exact text matching a near impossibility.

The alternative approach, which this submission endorses, is to use standard identifiers to allow the unambiguous management of identity. An identifier (sometimes called an “identifier name” to avoid confusion with an identification scheme) is a token that is associated with an entity on a one to one basis. That is, each entity is associated with exactly one identifier and each identifier is associated with exactly one entity.

Typically an identifier is made up of a string of characters. For historical reasons these are normally taken from the Arabic numerals and/or the letters of the Latin alphabet. There is no fundamental reason why characters in the extended alphabet used in other languages (such as å, ç and ö) or characters from other alphabets (such as those used in China, Japan and Korea) should not be used though this would present compatibility problems (that users of those alphabets probably already experience with the current practice).

An identifier string may contain a prefix indicating the type of identifier that it is, though this is often defined not to be part of the identifier itself. Similarly, particular punctuation or spacing may be used to make the identifier string easier to transcribe manually, though again this is usually defined as being not formally part of the identifier string.

Sometimes a “check character” is included so that transcription errors can be detected. This involves recalculating the check character and comparing the result with that provided. This will allow most corrupted identifier strings to be rejected.

Most identifiers are of fixed length, which makes for easier validation but creates a hard limit to the number of entities that can be identified.

Where an identifier is used to reference a particular entity, the only requirement is that both the sender and receiver of such an identifier have a shared understanding of the intended meaning of the use of the identifier string. This can be done on a bilateral basis by the partners to a particular communication exchanging code lists in advance. As an extension, this code list may be published to a group of users – as is often done by suppliers distributing product lists with ordering codes.

A further extension sees such a code list shared within a closed user group. This mesh of relationships gives rise to issues of updating and version control so it is often replaced with a common registry to which all users can refer. Most content identifiers are of this type.

Such a registry typically offers three classes of service to its users: *registration* by which new identifiers are created and placed into the registry, *resolution* by which an identifier can be transformed into something that allows the entity to be confirmed – typically the identity management metadata record and *query* by which users can find out the identifier associated with an entity they can define, typically by providing some or all of the identity management metadata.

Where a registry is established, it is important that there is a high level of trust between users and the registry operator, which is known as the Registration Authority (RA). This implies that there is broad consensus in the appointment of the RA. Many registries for creative content oriented identification schemes are operated under the auspices of ISO, the International Organization for Standardization. All these identifiers are managed within the committee ISO TC46/SC9⁷. Other identifiers are managed by other standards bodies (such as GS1⁸ for product identifiers) or consortiums (such as EIDR – see below – for audiovisual works).

Entities

The following classes of creation are relevant to this NOI:

Musical Works can be identified with an International Standard Music Work Code (ISWC), which is standardized by ISO in TC46/SC9 and published as ISO 15707. The RA is CISAC, the International Confederation of Societies of Authors⁹ and Composers and a network of registration agencies is formed of authors' societies and regional groupings. These are linked by a common search index that coordinates the assignment of codes and allows the registry to be searched.

Sound Recordings (as well as music video recordings) can be identified with an International Standard Recording Code (ISRC), which is standardized by ISO in TC46/SC9 and published as ISO 3901. The International Federation of the

Phonographic Industry (IFPI)¹⁰ acts as RA and national registration agencies assign prefixes (“registrant codes”) with which owners themselves assign ISRCs. There is no current registry though one is planned for both aggregation of legacy codes and assignment of future ones.

Notated Music (sheet music and books of music) can be identified with an International Standard Music Number (ISMN), which is standardized by ISO in TC46/SC9 and published as ISO 10957. The International ISMN Agency¹¹ acts as RA and although there is no registry of codes, there is a database from which the publisher of a particular ISMN can be determined.

Audiovisual Works (such as movies and television programs) can be identified with an International Standard Audiovisual Number (ISAN), which is standardized by ISO in TC46/SC9 and published as ISO 15706. The ISAN International Agency (ISAN-IA)¹² acts as RA, which operates a central registry and coordinates a network of national registration agencies.

Audiovisual Works can also be identified with a Digital Object Identifier (DOI)¹³ assigned by the Entertainment ID Registry (EIDR). DOI is standardized by ISO in TC46/SC9 and published as ISO 26324, but EIDR itself is managed by a consortium¹⁴ created by the movie industry. Because EIDR is constructed as a DOI, there is a central registry with a standard resolution mechanism using the Handle System¹⁵. Cooperation has been announced¹⁶ between ISAN and EIDR to enable painless registration in both systems.

Textual Works can be identified with an International Standard Text Code (ISTC), which is standardized by ISO in TC46/SC9 and published as ISO 21047. The RA is the International ISTC Agency¹⁷ (a consortium of text industry interests), which appoints registration agencies. There is a central registry,

Books can be identified with an International Standard Book Number (ISBN), which is standardized by ISO in TC46/SC9 and published as ISO 2108. The International ISBN Agency¹⁸ acts as RA and appoints national and regional registration agencies. There is no central registry but some national agencies made a national registry available.

Serials can be identified with an International Standard Serial Number (ISSN), which is standardized by ISO in TC46/SC9 and published as ISO 3297. The ISSN International Centre¹⁹ acts as RA and national centers act as registration agencies. An ISSN is assigned to a journal as a whole and not to individual issues of it.

Photographs are not yet served by an international standard. The PLUS Coalition²⁰ is developing standards that will be tested in a demonstrator project (based on Linked Content Coalition technology) with a view to proposing an international identifier thereafter.

Graphic Arts/Visual Arts are not served by an international standard either. This affects both freestanding works of art and commercial art, which is converging with photography as the workflows for image processing and image creation become indistinguishable.

Parties (people, groups and organizations) can be identified with an International Standard Name Identifier (ISNI), which is standardized by ISO in TC46/SC9 and published as ISO 27729. The ISNI International Agency²¹ acts as RA and agencies handle registrations in the central registry.

Communications

As well as standards for the identification of creative content, there are standards that specify ways of communicating the metadata (including standard and proprietary identifiers) for it.

Digital Data Exchange (DDEX)²² was formed as a consortium standards setting organization after the Music Industry Integrated Identifiers Project (MI3P) noted the potential benefits of aligning the messages used by different players in the music industry ecosystem. It is now extensively adopted and has an active development process. It specifies most of its messages using the technically capable XML technology but also allows more basic information to be carried in a “flat file” format to meet the needs of smaller implementers.

Importantly, all the elements contained in DDEX messages are rigorously defined in the DDEX Data Dictionary so that both the sender and the recipient have a shared understanding of the intended meaning.

ONIX²³ is a family of standard communication formats maintained by a steering group representing text industry interests worldwide. It has variants for books, serials and rights licensing, as well as registration formats for ISBN and ISTC aimed at high volume registrations.

The CISAC Common Works Registration²⁴ format is a format designed for the transmission of works information to and between authors’ societies. It is widely implemented by larger publishers and the technology providers that service smaller ones.

Benefits of the Use of Standard Identifiers by the Copyright Office Registration Systems

The main benefit to the Copyright Office and its stakeholders in the use of standard identifiers is that the registration database becomes interoperable with other databases that contain other data about the registered recordings. Here “interoperable” does not necessarily imply that the registration database should be directly connected to another database. Rather, because the same standard

identifier would appear in the relevant records of both databases, it would be possible to cross-reference the data.

To take an example, the Copyright Office might decide that it was beyond its role to record the genre of registered recordings. However, someone searching the registration database might want to limit their search to jazz recordings. If a commercial database like (say) Gracenote or Rovi held good genre information (and the same standard identifier) then the standard identifier in the results from the Copyright Office would allow a reliable search of the commercial database to confirm the genre of the recordings in the search results. Of course this might be conditional on a subscription to the commercial database.

In this way, data in the various databases (including the important copyright registration data held by the Copyright Office) can be combined with data held by others without any need for the operators to share their data with each other or forgo their access controls.

Because standard identifiers are in general global in scope, the Copyright Office data would become interoperable with worldwide databases. All the concerns that would otherwise exist about languages and scripts would be much reduced: the key to the interoperability would be a machine-readable identifier.

The public domain would be somewhat enhanced by the use of standard identifiers in two different ways. Firstly, the expiry date of the copyright term would be clear from the registration data and the standard identifier for the work would also be available. In due course, a potential user of a public domain work would be able to verify that the registration related to the work they wanted to use because the standard identifier would also be associated with the copies of the work that were in circulation. This would reduce the risk of accidentally using a later (but similarly titled work) that was still subject to copyright protection.

Secondly, there are cases such as sound recordings where rights in the underlying musical work probably have a longer term. Thus on expiry of the sound recording copyright, the musical work rights survive. The association between recording and work (documented by reference to their standard identifier) made during the term of the recording will remain valid and the rights in the musical work can be managed as the public domain recording is used.

Separately the use of standard party identifiers for individuals, groups and corporations will have the effect of reducing the orphan work problem, as a codified approach to identifying parties reduces uncertainties and allows changes in ownership to be managed in a managed and automated way.

Many classes of entity are referenced multiple times in the registration database. A musical work may be recorded multiple times and appear in connection with multiple sound recordings; a sound recording may appear on multiple compilations

and parties are likely to appear very many times if they own or were involved in the creation of numerous works. The use of standard identifiers allows these multiple appearances to be “clustered” even if the work titles are provided in slightly different ways or party names change over time. For example an author changing their name on marriage will not normally be given a new party identifier (unless they choose to represent the new name as a new identity – a new persona) so this identifier will allow the clustering of pre- and post-marriage works. Similarly changes in corporate names will not result in changes of party identifier allowing ownership to be tracked later.

Benefits of the Use of Standard Communication Systems by the Copyright Office Registration Systems

Where industries have spent time and energy to specify and implement standard systems for the communication of data relating to creative works, it may be assumed that there is considerable expertise in this area. Therefore if the Copyright Office implements protocols based on these systems, it will (in aggregate) require considerably less effort from them than building an entirely new system. Equally, the existence of this expertise within entities that provide development and integration services mean that it should require rather less effort within the Copyright Office than an entirely new system.

One of the features of these standard communication systems is a well-developed data dictionary that defines the terms used in the messages specified by these systems. This mitigates the effect of overloaded terms like “producer” and “release date”. Though the Copyright Office will need to ensure that these definitions are consistent with its intentions, their use will considerably reduce the risk of miscommunication.

As well as standard systems that can be used for registration of copyrighted works, there are standards for accessing databases that would be applicable to the registration databases operated by the Copyright Office. This submission will not cover this in any detail except to note that their availability will allow application developers to exploit the database interoperability that the use of standard identifiers offers. Less important than the technology used to implement such an interface is the capability that it provides. A richer and more capable interface is to be preferred over a narrow search facility. In particular, the ability to express complex search criteria (preferably across multiple content types) would give developers the greatest ability to craft innovative and useful applications.

Recommendations

1. Support standard content identifiers in registrations

The Copyright Office should enhance its current support for standard identifiers by reviewing the available identifiers (including those highlighted in this submission) and ensuring that the appropriate identifier can be included in a registration.

2. Support ISNI as a standard party identifier

The Copyright Office should allow the use of ISNI in registrations to identify any involved party.

3. Recognize the impact of functional granularity

The Copyright Office should accommodate the differences between the granularity of standard identifiers and the granularity of copyright subsistence. A work may be revised in a way that does not give rise to any copyright change but does require a new identifier for reasons unconnected with copyright. This may mean that works properly identified with an identifier that is not present in the registration database are nevertheless be covered by a registration. The Copyright Office should not assume that the absence of a new identifier means that no registration exists.

Neither should the Copyright Office place the burden of a new transaction on such registrants. However it should consider whether the “registry of links” recommended below related to back-fill may allow the association of a new identifier with an existing record without the full majesty (and cost) of a new registration.

In any case industry databases will cluster these identifiers and these will become interoperable with the Copyright Office’s systems.

4. Support “Required Request”

To borrow a phrase from the organ transplant world, the Copyright Office should implement a “required request” system for standard identifiers so that the system will always prompt for an identifier if one is not provided.

5. Validate identifiers

As a minimum the Copyright Office should perform a basic syntax validation on provided identifiers. This would involve checking the number of characters, that each element is taken from the correct character set and that check characters are valid. Further validation might for instance check that country code elements within identifiers appear on the appropriate lists.

6. Reject duplicated identifiers

The Copyright Office should ensure that when an identifier is provided, it has not already been registered (other than in one of the permitted circumstances

mentioned above). Such use of an identifier will always indicate a problem that is much easier to rectify at the registration stage than later when the invalid identifier has proliferated.

7. Resolve offered identifiers

Many standard identifiers already offer a resolution service and others are moving towards this. The Copyright Office should utilize such service to ensure the accuracy of provided identifiers. An identifier offered as part of a registration should be offered to the relevant resolution service and the returned metadata compared with the rest of the registration metadata. Though a verbatim match will probably not be obtained, the Copyright Office should consider rejecting registrations where there is a wide enough difference.

8. Move towards mandatory provision of identifiers

There would probably not currently be broad enough support for the Copyright Office to require standard identifiers for all registered creative works. However it is quite plausible that this will change in the near future, driven by increased online commerce. At that point the Copyright Office should not hesitate to review the situation and consult stakeholders with a view to implementing a requirement for identifiers to be provided. Factors that should be taken into consideration should include the cost of obtaining a standard identifier relative to (i) registration costs and (ii) production costs.

A requirement to provide a standard party identifier such as ISNI should be treated in the same way and will probably gain support rather quickly because of the clear benefits to registrants in getting paid.

9. Design for mandatory provision now

The Copyright Office should ensure that a system specified now is able to support mandatory provision even if it not expected to enable that feature for some time. Features included in the main build will inevitably be far less expensive to implement than changes made later.

10. Move towards multiple registration

The Copyright Office should consider integrating its registration systems with the registration systems of standard identifiers. A frequently heard complaint from smaller rights owners is that they have to type the same information into numerous systems. A confederation of registration systems (which could readily include the Copyright Office) could arrange things so that information entered for one purpose could be reused for other purposes, or perhaps forwarded on request. In these circumstances a single transaction could obtain a standard identifier, register the

work at the Copyright Office, submit it to a collective management organization and have it included in industry databases used for resource discovery.

Alternatively, the Copyright Office should ensure that its interfaces are open to third party service providers who could then provide such multiple registration services as part of a commercial deal.

11. Enable late provision of standard identifiers

The Copyright Office should make provision for registrants to provide the standard identifier at some point after copyright registration. It has been suggested that it is not possible to obtain a standard identifier for some classes of work until considerable detail in the metadata has become available. In this case, the Copyright Office should consider provisioning a one-time key to that registration record so that the identifier can, within a reasonable time, be inserted. Whether is a need for some form of sanction if it is not provided is a matter for the Copyright Office to consider.

12. Enable back-fill

The Copyright Office should consider the implications of the large volume of registrations made to date that do not carry a standard identifier, but where the registered work has in fact been assigned one. To allow retrospective alteration of the registration record is a serious step but something short of this might be just as effective. A registry of links between Copyright Office local identifiers and standard identifiers might be less authoritative than the registration record itself (see the notes above about reputation management) but with an interface to this service, the same information can be obtained.

13. Support industry-standard messaging systems

The Copyright Office should support appropriate profiles of messaging systems that have been widely implemented to provide registration metadata. This might simply provide the data to the Copyright Office systems or it might be a full protocol to execute a registration. Early consideration should be given to DDEX and ONIX, with examination of CWR as well.

14. Examine registration fee elasticity

The Copyright Office should examine the relationships between volumes of registrations and the fee charged. It would appear possible that the provision of an almost completely automated system could take a lot of the marginal cost out of the system (though the impact of manual intervention should not be underestimated). If that is the case, then a significant reduction in the registration fee might stimulate a significant increase in registrations, to the benefit of all stakeholders.

15. Provide rich automated search interfaces

The Copyright Office should review available technologies that might be used to provide a machine-to-machine search interface (otherwise described as an Application Programming Interface) and implement one or more in as capable a way as possible. It should however recognize the rate of change in these technologies and plan for the interface to evolve rather faster than then underlying database needs to.

16. Engage in standards development

The Copyright Office might usefully be involved in the development of the standards mentioned in this submission, even if only on a papers-only basis (i.e., not attending the meetings and phone conferences). As a major potential user of these important documents and systems this would be entirely appropriate and would ensure that future standards and revisions to existing ones meet the needs of its stakeholders in their use of the systems it operates.

Conclusions

There is considerable scope for the Copyright Office's systems to be updated to use standard identifiers and standard messaging systems to make those systems more useful to all stakeholders. Interoperability with other systems will allow more trustworthy searching and aggregation of information about works that have been registered.

The submitter is very willing to provide more information on these recommendations on request and to participate in further stages of this important process.

¹ Godfrey Rust, Mark Bide, “The <indecs> metadata framework - Principles, model and data dictionary”. (Report, Indecs Framework Ltd, 2000), Available online at http://www.doi.org/topics/indecs/indecs_framework_2000.pdf

² Projects that are based in whole or part on the Indecs analysis include the Digital Object Identifier (DOI) and its implementation for audiovisual works the Entertainment ID Registry (EIDR), the International Standard Recording Code (ISRC), International Standard Name Identifier (ISNI) and the International Text Code (ISTC). The book industry’s ONIX systems and the music industry’s DDEX systems are also based on Indecs.

³ <http://www.linkedcontentcoalition.org>

⁴ Linked Content Coalition, Principles of Identification v1.0, available from <http://www.linkedcontentcoalition.org>

⁵ Paul Jessop, “Analysis Report on Function Requirements for the International Music Registry (IMR)”, Report, World International Property Organization, 2012), Available online at http://www.internationalmusicregistry.org/export/sites/imr/portal/en/pdf/analysis_report_on_function_requirements.pdf

⁶ Digital Millennium Copyright Act, Section 1202. Termed *Rights Management Information* in the WIPO Copyright Treaty (Article 12) which defines it as “information which identifies the work, the author of the work, the owner of any right in the work, or information about the terms and conditions of use of the work, and any numbers or codes that represent such information” and the WIPO Performances and Phonograms Treaty (Article 19) which has similar text

⁷ http://www.iso.org/iso/iso_technical_committee.html?commid=48836

⁸ <http://www.gs1.org/>

⁹ <http://iswcnet.cisac.org/>

¹⁰ <http://www.ifpi.org/isrc>

¹¹ <http://www.ismn-international.org/>

¹² <http://www.isan.org/>

¹³ <http://www.doi.org/>

¹⁴ <http://eidr.org/>

¹⁵ <http://www.handle.net/>

¹⁶ <http://eidr.org/eidr-and-isan-to-provide-seamless-registration-of-content-ids/>

¹⁷ <http://www.istc-international.org/>

¹⁸ <http://www.isbn-international.org/>

¹⁹ <http://www.issn.org/>

²⁰ <http://www.useplus.com/>

²¹ <http://www.isni.org/>

²² <http://ddex.net/>

²³ <http://www.editeur.org/8/ONIX/>

²⁴ <http://www.cisac.org/CisacPortal/cisacDownloadFile.do?docId=12728>