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ISO/TC 46/SC 9 N 303
2001-02-27

To: Leonardo Chiariglione, Convenor of ISO/IEC JTC 1/SC 29/WG 11

cc. Yukiko Ogura, ISO/IEC JTC 1/SC 29 Secretariat
Keith Hill, Chairman MPEG-21
Rob Koenen, Chairman MPEG Requirements Group

Sophie Clivio, ISO Central Secretariat
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Members of ISO TC 46/SC 9
Catherine Mattenet, Secretariat of ISO TC 46
RA and Project Leaders for ISO TC 46/SC 9 identifier schema

From: Jane Thacker, ISO TC 46/SC 9 Secretariat

Title: Liaison statement to ISO/IEC JTC 1/SC 29/WG 11 on MPEG-21 projects concerning digital item identification

ISO TC 46/SC 9 thanks JTC 1/SC 29/WG 11 for their liaison statements concerning the MPEG-21 project. We are in complete agreement that the MPEG-21 project must develop its work in close collaboration with other standards committees in related subject areas.

The MPEG Proposed Draft Technical Report for the Multimedia Framework as well as the Calls for Proposal on Digital Item Identification and Description and Digital Item Declaration have been distributed to the members of ISO TC 46/SC 9 via our Web site. Copies have also been sent to the Registration Authorities and Project Leaders for identifier systems and projects developed or in process within our committee, i.e. ISBN, ISSN, ISRC, ISAN, ISWC, ISTC, ISMN and ISRN.

Given the breadth of the MPEG-21 project it is difficult to provide a comprehensive reaction on the part of ISO/TC 46/SC 9 at this point in time. For that reason, we are focussing our current efforts on the Digital Item Identification and Description stream of the MPEG-21 project.

The technologies developed under the MPEG-21 umbrella must take into account the existing identifier systems developed or in process within ISO TC 46/SC 9 for the industries affected by those technologies. These identifier schema are the outcome of careful and protracted negotiation between the interested parties involved. There is a huge investment in their administration and implementation within the industries they serve.

In response to the MPEG-21 Call for Proposals on Digital Item Identification and Description (MPEG document WG 11 N 3942) the ISO TC 46/SC 9 Secretariat has organized a joint response from the Registration Authorities and Project Leaders for the ISBN, ISSN, ISRC, ISAN, ISWC and ISTC. That response has been submitted to JTC1/SC29/WG11 as document M7001, titled "*International Standard Identifiers for Use in the Music, Film, Video, Sound Recording, and Publishing Industries: Joint Response to the MPEG Call for Proposals for Digital Item Identification and Description*".

The Joint Response demonstrates that the ISAN, ISBN, ISRC, ISSN, ISTC, and ISWC support the overall goals and meet the specific requirements set out in the MPEG Call for Proposals for Digital Item Identification and Description. The response also highlights a number of collaborative efforts involving the participating organizations that are designed to facilitate interoperability in a networked environment, and outlines a joint program of work that is currently being planned to address outstanding needs in that area.

Philippa Morrell of the Registration Authority for ISO 3901 (ISRC) will present this Joint Response at the March 2001 meeting of MPEG-21 in Singapore.

ISO TC 46/SC 9 expects that any further work within the Digital Item Identification and Description stream of the MPEG-21 project will focus on technologies to further support and enhance the use of these identifiers instead of developing alternate or competing schema that do not have the support and agreement of their respective industries. We respectfully submit that the latter course of action would be outside the scope of JTC 1/SC 29 Working Group 11.

ISO TC 46/SC 9 looks forward to the outcome of the Joint Response submitted to JTC 1/SC 29/WG 11 as MPEG2001 document M7001.

Attached: Copy of the Joint Response (minus annexes A-F).

Copy attached to ISO TC 46/SC 9 N 303
2001-02-27

Originally submitted to MPEG-21 as: **ISO/IEC JTC1/SC29/WG11**
MPEG2001/M7001
March 2001

Title: International Standard Identifiers for Use in the Music, Film, Video, Sound Recording, and Publishing Industries: Joint Response to the MPEG Call for Proposals for Digital Item Identification and Description

Authors: International Confederation of Societies of Authors and Composers (CISAC)
International Federation of Film Producers Associations (FIAPF)
International Federation of the Phonographic Industry (IFPI)
International ISBN Agency
ISO TC46/SC9/WG3—International Standard Textual Work Code (ISTC)
ISSN International Centre

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International Standard Identifiers for Use in the Music, Film, Video, Sound Recording, and Publishing Industries

Abstract

This response demonstrates that the ISAN, ISBN, ISRC, ISSN, ISTC, and ISWC support the overall goals and meet the specific requirements set out in the MPEG Call for Proposals for Digital Item Identification and Description, and that they are designed to interact effectively with the other six elements of the multimedia framework outlined in the MPEG-21 Draft Technical Report. The response also provides a preliminary assessment of the potential interface between the schemas embodied in these ISO standards for identification and description and the schema for Digital Item Declaration proposed in the Working Draft produced for the Multimedia Description Schemes (MDS) Group.

1. Introduction

This response to the MPEG Call for Proposals for Digital Item Identification and Description is submitted by the organizations responsible for development of the following ISO standards:

International Standard Audiovisual Number (ISAN)
International Standard Book Number (ISBN)
International Standard Recording Code (ISRC)
International Standard Serial Number (ISSN)
International Standard Textual Work Code (ISTC)
International Standard Musical Work Code (ISWC)

The response is intended to demonstrate: (a) that the schemas embodied in these standards are designed to support the overall goals for digital item identification and description as set out in the Call for Proposals; (b) that they meet the specific requirements for digital item identification and description listed in Annex B of the Call for Proposals; and, (c) that they are designed to interact effectively with the other six elements of the multimedia framework outlined in the MPEG-21 Draft Technical Report.

The response also highlights a number of collaborative efforts in which the proponents are involved that are designed to facilitate interoperability in a networked environment, and outlines a joint program of work that is currently being planned to address outstanding needs in that area.

In addition, the response provides a preliminary assessment of the potential interface between the schemas embodied in the ISO standards for identification and description and the schema for Digital Item Declaration proposed in the Working Draft produced for the Multimedia Description Schemes (MDS) Group. That assessment identifies a number of ambiguities, discrepancies, and lacunae in the proposed abstract model and digital item declaration language that need to be resolved before effective interfaces between the Digital Item Declaration and Digital Item Identification and Description elements of the MPEG-21 framework can be implemented.

Finally, the response puts forward a number of recommendations relating to the incorporation of existing and future ISO schemas for item identification and description as integral components of the MPEG-21 framework, and collaboration between MPEG and the proponents on efforts to further enhance the effective use of these schemas in a networked environment.

2. Overview

The schemas submitted with this response have all been designed to support the overall goals for digital item identification and description as set out in the Call for Proposals—unique, accurate, reliable, and seamless identification; persistent association of identifiers with the items identified; integrity of identifiers and descriptions; and facilitation of automated processing of transactions.

By way of an overview, the features common to the schemas submitted, and their pertinence to the overall goals for digital item identification and description are highlighted below.

Unique identification

- Within their respective domains, the schemas provide unique identification for all items registered.
- Each identifier is assigned only once, and cannot be altered or re-assigned.
- In an analog environment, the schemas are differentiated and made globally recognizable through the use of a prescribed domain label ("ISAN", "ISBN", "ISRC", "ISSN", "ISTC", or "ISWC").
- In a digital environment, the schemas can be differentiated and made recognizable to both local and networked applications through the use of content designators or codes paralleling the prescribed domain labels.

Accurate, reliable identification

- The schemas are supported by instructions for the assignment of identifiers that are incorporated, in part, in the standards themselves, and supplemented through user manuals and other documentation developed by the registration authorities.

- Quality control is enhanced through the maintenance of directories and databases, both centrally by the international registration authority for the schemas and at the national/regional level by accredited registration agencies.

Seamless identification

- Collectively the schemas are used to identify a broad range of content in various media (musical works, audiovisual works, sound recordings and music video recordings, textual works, monographic publications, and serial publications).

- The defined scope of application for each schema provides an implicit categorization of the items identified.

- Detailed categorization of registered items is achieved through the use of prescribed values for "type" of entity defined as part of the data element set established for the individual schemas.

- The data element sets established for a number of the schemas differentiate between versions of an entity and provide mechanisms for linking related versions.

- The level of itemization/aggregation to which the identifier applies is clearly defined for each of the schemas.

- The schemas have been incorporated into applications providing a finer level of granularity by combining assigned identifiers with extensions to identify components (e.g., SICI, BICI).

Persistent association

- The schemas incorporate rules for application that ensure persistent association of each identifier with the item registered.

- Reuse of an assigned identifier is not permitted under any circumstances; no alteration or replacement of an assigned identifier is permitted.

- The schemas require the identifier to be permanently and securely encoded in all digital manifestations of the registered item.

- The identifiers registered under the schemas pertain to the entities identified and function independently of location or other associations with those entities that may be transitory.

Integrity of identifiers and descriptions

- The schemas are supported by administrative systems designed to ensure integrity at all levels.

- Each schema has an established registration authority operating at the international level to oversee its administration and ensure integrity system-wide.

- Registration agencies operate at a national or regional level to facilitate liaison with registrants and to control the quality of assignments and registration.

- Administrative procedures incorporate well-defined criteria for accrediting national/regional registration agencies and establishing the eligibility of registrants.

- Each of the schemas defines a core set of data elements designed to ensure accurate description of the entity identified.

- User manuals provide instructions to assist in accurate and consistent assignment of identifiers and recording of descriptive data.

- Registration authorities and agencies maintain directories of registrants and databases of assigned identifiers and their associated descriptions.

- A number of the schemas incorporate in the identifier a check character (calculated in accordance with ISO 7064) as a means of ensuring the integrity of the identifier and automatic detection of transcription errors.

Automated processing

- The schemas are designed for use in a wide range of automated applications within the music, recording, film, video and publishing industries for inventory management, distribution, order fulfilment, invoicing, tracking of royalties, etc.

- The identifiers are also used in automated applications across a broader user community that includes wholesalers, retailers, broadcasters, abstracting and indexing services, libraries, archives, and other information service providers, as well as organizations administering intellectual property rights.

- The standardized structure for the identifiers defined in the schemas is designed specifically to facilitate automated processing.

- Specific elements within the identifier (e.g., those referencing country and/or date of registration, and the check character) are defined in accordance with widely deployed ISO standards for information processing.

It is important to note further that the schemas submitted in this response are designed for application not only to digital items but to their analog counterparts as well. Although the requirements set out in the MPEG-21 multimedia framework relate only to the identification and description of digital items, in the current e-commerce environment identifiers are needed to facilitate networked functions such as inventory management, distribution, order fulfilment, and invoicing for the full range of products offered (both digital and analog), and the administration of rights, tracking of royalties, etc. applicable to all manifestations of a work. In that respect, the broader scope of these schemas, and the seamless integration of identification and description for both digital and analog items that they provide are critical to the support of the business models being adopted in the content industries.

3. MPEG-21 Requirements for Digital Item Identification and Description

Each of the six tables that follow lists the sixteen requirements set out in Annex B of the Call for Proposals for Digital Item Identification and Description. Each table assesses one of the six ISO standards submitted in this response (ISAN, ISBN, ISRC, ISSN, ISTC, ISWC) against those sixteen requirements and provides information on how each of the requirements is met.

For additional details on each of the standards see Annexes A – F.

[Note: To compensate for an apparent error in numbering in the Call for Proposals, the two distinct requirements listed under number 6 in the CfP have been separated and renumbered as 6 and 7. The original numbering resumes with requirement number 8.]

Table 1: International Standard Audiovisual Number (ISAN)

Requirement	Met/Not Met	Comments
1. The solution shall support interoperability with the other elements of MPEG-21 including support for technologies for privacy, rights management and event reporting.	Met	■ The ISAN is designed to facilitate business applications relating to the allocation of royalties among rights holders, tracking usage, the verification of registrations for anti-piracy purposes, etc. through the unique identification of audiovisual works. ■ The ISAN also functions as a component of the Universal Program Identifier (UPID) that is being developed by SMPTE to facilitate broadcasting applications.
2. The solution shall provide for identification and description schemas for Digital Items which are intended to persist through the life of such Digital Items.	Met	■ The standard prohibits re-assignment or alteration of the identifier. ■ The standard requires the identifier to be securely embedded in or affixed to all copies of the work.
3. The solution shall be scalable, persistent, efficient, flexible and extensible.	Met	■ The standard specifies an identifier that is sixteen hexadecimal digits in length. ■ A proposal is in development for combining the ISAN with a suffix of eight hexadecimal digits to create a Universal Program Identifier (UPID) for the identification of a particular version of an audiovisual work.
4. The solution should be of the toolbox or plug-in type.	Met	■ The specification for the identifier makes it amenable to implementation in applications of all types.
5. The solution should accommodate and support existing ISO-standardised and other identification systems.	Met	■ The ISAN is currently an ISO Draft International Standard (DIS).
6. The solution shall allow for backward compatibility with upgrades.	Met	■ The ISO standards process effectively ensures backward compatibility of future revisions.
7. The solution shall be able to identify the identification and description system used for the digital item.	Met	■ The standard requires eye-readable displays of the identifier to be preceded by the label “ISAN”. In digital form, the identifier can be identified as an ISAN through tagging or coding.

Requirement	Met/Not Met	Comments
8. The solution shall be able to identify the content type.	Met	■ The prescribed scope of application for the ISAN provides implicit identification of the item as an audiovisual work (as defined in the standard). ■ The descriptive data required for registration provides more specific identification of the content type in accordance with prescribed categories.
9. The solution shall provide an efficient resolution system for links to related Digital Items, such as different versions, different manifestations of the same Digital Item, different names of the same Digital Item (e.g., aliases, nicknames), their elements, etc.	Met	■ The descriptive data required for registration requires identification of the work as a modified version of another audiovisual work, if applicable, and a link to the related work that incorporates the title of the related work, the ISAN assigned to the related work, if applicable, and the type of modification (identified according to prescribed categories). ■ As a component of the Universal Program Identifier (UPID), the ISAN serves as a mechanism for relating various manifestations of the same audiovisual work and facilitating efficient resolution to all related manifestations.
10. The solution shall enable identification and processing of Actions, including the discovery of usage rules.	Met	■ The ISAN is designed to facilitate automated look-up and access to audiovisual works and their associated descriptions. ■ As a component of the Universal Program Identifier (UPID), the ISAN can be used in various broadcasting applications, including program scheduling, queuing, and programmed recording of broadcasts.
11. The solution shall enable identification and processing of Transactions, including the discovery of usage rules.	Met	■ The ISAN is designed for use in a wide range of business transactions including the allocation of royalties among rights holders, tracking usage, and verifying registrations for anti-piracy purposes.
12. The solution shall enable the identification of Users of Digital Items.	Met	■ The registration authority maintains a central database of ISAN registrants (i.e., the producers of audiovisual works and their authorized proxies).

Requirement	Met/Not Met	Comments
13. The solution shall allow for conditional access to identifiers and descriptions.	Met	■ Access to registrant and descriptive data is controlled by the international registration authority and the ISAN registration agencies. ■ Conditional access is permitted to a subset of the descriptive data associated with the ISAN for purposes of determining the identity of the work to which the ISAN has been assigned.
14. The solution shall accommodate protection of integrity of identifiers, including graceful degradation.	Met	■ Administrative procedures ensure the integrity of the registration process. ■ The standard prohibits the re-use or alteration of an ISAN. ■ The international registration authority maintains a central database of all registrations (including descriptive data). ■ The standard requires the addition of a check character when the ISAN is displayed in human-readable form as a means of ensuring automatic detection of transcription errors.
15. The identifier shall be globally-unique, and location-independent (i.e., the name should not depend on the physical location of the Digital Item).	Met	■ Within the domain administered by the ISAN registration authority, all assignments are unique. ■ The use of the preceding label “ISAN” or its equivalent in coded form serves to make the identifier unique on a global scale. ■ The ISAN identifies the work independently of any specific manifestation of the work, and independently of physical location.
16. The solution shall optionally provide a mechanism for distributed ID assignment and registration.	Met	■ The administrative structure for the ISAN registration system provides for a network of registration agencies as well as an international registration authority. ■ The international registration authority is responsible for overall governance, the certification of registration agencies, and the maintenance of a central database of registrants, assignments, and descriptive information. ■ The registration agencies are responsible for processing applications and maintaining records of assignments.

Table 2: International Standard Book Number (ISBN)

Requirement	Met/Not Met	Comments
1. The solution shall support interoperability with the other elements of MPEG-21 including support for technologies for privacy, rights management and event reporting.	Met	■ The ISBN is designed to facilitate business applications relating to inventory management, order fulfilment, acquisition, cataloguing, circulation, interlibrary lending, and information retrieval through the unique identification of books and other monographic publications (including mixed media publications, educational films/videos and transparencies, books on cassettes, microcomputer software, electronic publications, microform publications, Braille publications, and maps).
2. The solution shall provide for identification and description schemas for Digital Items which are intended to persist through the life of such Digital Items.	Met	■ The standard prohibits re-assignment or alteration of the identifier. ■ The standard requires the identifier to be embedded in or affixed to all copies of the publication.
3. The solution shall be scalable, persistent, efficient, flexible and extensible.	Met	■ The standard specifies an identifier of ten digits (with values 0 to 9), comprising a group identifier that varies in length according to the title output of the group concerned, a publisher or producer identifier that varies in length according to the title output of the publisher or producer concerned, a title identifier, the length of which is determined by the length of the group and publisher or producer identifiers that precede it, and a check character. ■ There is currently a proposal under consideration for the expansion of the ISBN to thirteen digits. ■ The ISBN is also used as a component of the Book Item and Component Identifier (BICI) to identify a specific chapter, illustration, chart, etc. or a particular component of a book or monographic publication.
4. The solution should be of the toolbox or plug-in type.	Met	■ The specification for the identifier makes it amenable to implementation in applications of all types.

Requirement	Met/Not Met	Comments
5. The solution should accommodate and support existing ISO-standardised and other identification systems.	Met	■ The ISBN (third edition, 1992) is an approved ISO standard.
6. The solution shall allow for backward compatibility with upgrades.	Met	■ The ISO standards process effectively ensures backward compatibility of future revisions.
7. The solution shall be able to identify the identification and description system used for the digital item.	Met	■ The standard requires eye-readable displays of the identifier to be preceded by the label “ISBN”. In digital form, the identifier can be identified as an ISBN through tagging or coding.
8. The solution shall be able to identify the content type.	Met	■ The prescribed scope of application for the ISBN provides implicit identification of the item as a monographic publication (as defined in the standard).
9. The solution shall provide an efficient resolution system for links to related Digital Items, such as different versions, different manifestations of the same Digital Item, different names of the same Digital Item (e.g., aliases, nicknames), their elements, etc.	Met	■ As a component of the Book Item and Component Identifier (BICI), the ISBN serves as a mechanism for relating individual chapters, illustrations, charts, etc. or particular components of a book or monographic publication to the publication as a whole.
10. The solution shall enable identification and processing of Actions, including the discovery of usage rules.	Met	■ The ISBN is designed to facilitate automated look-up and access to monographic publications and their associated descriptions.
11. The solution shall enable identification and processing of Transactions, including the discovery of usage rules.	Met	■ The ISBN is designed for use in a wide range of business transactions including inventory management, order fulfilment, acquisition, cataloguing, circulation, interlibrary lending, and information retrieval.
12. The solution shall enable the identification of Users of Digital Items.	Met	■ The registration agencies maintain directories of ISBN registrants (i.e., the publishers of the books and other monographic publications).

Requirement	Met/Not Met	Comments
13. The solution shall allow for conditional access to identifiers and descriptions.	Met	■ Access to registrant data is controlled by the international registration authority and the ISBN registration agencies. ■ Conditional access is permitted to a subset of the descriptive data associated with the ISBN for purposes of determining the identity of the publication to which the ISBN has been assigned.
14. The solution shall accommodate protection of integrity of identifiers, including graceful degradation.	Met	■ Administrative procedures ensure the integrity of the registration process. ■ The standard prohibits the re-use or alteration of an ISBN. ■ The registration agencies maintain databases of all block assignments to publishers and producers.
15. The identifier shall be globally-unique, and location-independent (i.e., the name should not depend on the physical location of the Digital Item).	Met	■ Within the domain administered by the ISBN registration authority, all assignments are unique. ■ The use of the preceding label “ISBN” or its equivalent in coded form serves to make the identifier unique on a global scale. ■ The ISBN identifies the monographic publication independently of physical location.
16. The solution shall optionally provide a mechanism for distributed ID assignment and registration.	Met	■ The administrative structure for the ISBN registration system provides for a network of group registration agencies as well as an international registration authority. ■ The international registration authority is responsible for overall governance, the certification of ISBN registration agencies, and the maintenance of a central database of ISBN group assignments. ■ The ISBN registration agencies are responsible for processing registrant applications and maintaining databases of block assignments to publishers and producers, including registrant data.

Table 3: International Standard Recording Code (ISRC)

Requirement	Met/Not Met	Comments
1. The solution shall support interoperability with the other elements of MPEG-21 including support for technologies for privacy, rights management and event reporting.	Met	■ The ISRC is designed to facilitate business applications relating to the tracking of usage and the collection of royalties on behalf of rights holders through the unique identification of sound recordings and music video recordings.
2. The solution shall provide for identification and description schemas for Digital Items which are intended to persist through the life of such Digital Items.	Met	■ The standard prohibits re-assignment or alteration of the identifier. ■ The standard requires the identifier to be permanently and securely encoded in all copies of the sound recording or music video recording.
3. The solution shall be scalable, persistent, efficient, flexible and extensible.	Met	■ The standard specifies segmentation of the ISRC into a two-letter country code (in accordance with ISO 3166-1), a registrant code comprising three alphanumeric characters, a year of reference element comprising two digits, and a designation code consisting of five digits.
4. The solution should be of the toolbox or plug-in type.	Met	■ The specification for the identifier makes it amenable to implementation in applications of all types.
5. The solution should accommodate and support existing ISO-standardised and other identification systems.	Met	■ A revised version of the 1986 ISRC standard, in the form of an ISO Draft International Standard (DIS), is currently in the final voting stage.
6. The solution shall allow for backward compatibility with upgrades.	Met	■ The ISO standards process effectively ensures backward compatibility of future revisions.
7. The solution shall be able to identify the identification and description system used for the digital item.	Met	■ The standard requires eye-readable displays of the identifier to be preceded by the label “ISRC”. In digital form, the identifier can be identified as an ISRC through tagging or coding.

	Requirement	Met/Not Met	Comments
8.	The solution shall be able to identify the content type.	Met	■ The prescribed scope of application for the ISRC provides implicit identification of the item as a sound recording or a music video recording (as defined in the standard). ■ Specifications for more detailed identification of content type are to be established by the international registration authority in consultation with other relevant bodies.
9.	The solution shall provide an efficient resolution system for links to related Digital Items, such as different versions, different manifestations of the same Digital Item, different names of the same Digital Item (e.g., aliases, nicknames), their elements, etc.	Met	■ The ISRC provides unique identification for sound recordings and music videos at multiple levels of granularity, as required by the producer, and can thus be employed efficiently in resolution systems.
10.	The solution shall enable identification and processing of Actions, including the discovery of usage rules.	Met	■ The ISRC is designed to facilitate automated look-up and access to sound recordings and music video recordings and their associated descriptions.
11.	The solution shall enable identification and processing of Transactions, including the discovery of usage rules.	Met	■ The ISRC is designed for use in a wide range of business transactions including the tracking of usage and the collection of royalties on behalf of rights holders.
12.	The solution shall enable the identification of Users of Digital Items.	Met	■ The national registration agencies maintain directories of ISRC registrant codes and the registrants to whom they were allocated (i.e., the producers of the sound recordings and music video recordings).
13.	The solution shall allow for conditional access to identifiers and descriptions.	Met	■ Access to descriptive data is controlled by the registrant.

Requirement	Met/Not Met	Comments
14. The solution shall accommodate protection of integrity of identifiers, including graceful degradation.	Met	■ Administrative procedures ensure the integrity of the registration process. ■ The standard prohibits the re-use or alteration of an ISRC. ■ The national registration agencies maintain databases of all the registrant codes that they have assigned and the registrants to whom the codes were assigned.
15. The identifier shall be globally-unique, and location-independent (i.e., the name should not depend on the physical location of the Digital Item).	Met	■ Within the domain administered by the ISRC registration authority, all assignments are unique. ■ The use of the preceding label “ISRC” or its equivalent in coded form serves to make the identifier unique on a global scale. ■ The ISRC identifies the recording independently of any specific manifestation of the recording, and independently of physical location.
16. The solution shall optionally provide a mechanism for distributed ID assignment and registration.	Met	■ The administrative structure for the ISRC registration system provides for a network of national registration agencies as well as an international registration authority. ■ The international registration authority is responsible for overall governance and the certification of national registration agencies. ■ In the absence of a national registration agency for a specific country or region, the international registration authority may perform the functions associated with ISRC administration for that country or region. ■ The national registration agencies are responsible for processing registrant applications and maintaining records of the assignment of registrant codes.

Table 4: International Standard Serial Number (ISSN)

Requirement	Met/Not Met	Comments
1. The solution shall support interoperability with the other elements of MPEG-21 including support for technologies for privacy, rights management and event reporting.	Met	■ The ISSN is designed to facilitate business applications relating to inventory management, order fulfilment, acquisition, cataloguing, circulation, interlibrary lending, and information retrieval through the unique identification of serial publications.
2. The solution shall provide for identification and description schemas for Digital Items which are intended to persist through the life of such Digital Items.	Met	■ The standard prohibits re-assignment or alteration of the identifier. ■ The standard requires the international registration authority to publish an international register of assigned identifiers and their associated descriptive data. ■ The ISSN remains in the international register even after the serial has ceased publication. ■ The standard requires the identifier to be displayed in all issues of the serial.
3. The solution shall be scalable, persistent, efficient, flexible and extensible.	Met	■ The standard specifies a seven digit serial number (in a range from 0000001 through 9999999) followed by a check character. ■ The ISSN is also used as a component of the Serial Item and Contribution Identifier (SICI) to identify a particular issue of a serial publication or a specific article or contribution contained in the publication.
4. The solution should be of the toolbox or plug-in type.	Met	■ The specification for the identifier makes it amenable to implementation in applications of all types. ■ A URN implementation has been developed to enable the use of the ISSN as an actionable identifier.
5. The solution should accommodate and support existing ISO-standardised and other identification systems.	Met	■ The ISSN (third edition, 1998) is an approved ISO standard. ■ The ISSN standard incorporates several other ISO standards through normative references.
6. The solution shall allow for backward compatibility with upgrades.	Met	■ The ISO standards process effectively ensures backward compatibility of future revisions.

Requirement	Met/Not Met	Comments
7. The solution shall be able to identify the identification and description system used for the digital item.	Met	■ The standard requires eye-readable displays of the identifier to be preceded by the label "ISSN". In digital form, the identifier can be identified as an ISSN through tagging or coding.
8. The solution shall be able to identify the content type.	Met	■ The prescribed scope of application for the ISSN provides implicit identification of the item as a serial publication (as defined in the standard). ■ The descriptive data required for registration provides more specific identification of the content type in accordance with prescribed categories.
9. The solution shall provide an efficient resolution system for links to related Digital Items, such as different versions, different manifestations of the same Digital Item, different names of the same Digital Item (e.g., aliases, nicknames), their elements, etc.	Met	■ The descriptive data required for registration requires identification of related serials through links that incorporate the ISSN and key title assigned to the related serial, if applicable, or the title of the related serial. ■ As a component of the Serial Item and Contribution Identifier (SICI), the ISSN serves as a mechanism for relating individual issues of a serial and articles and contributions contained in those issues to the serial publication as a whole.
10. The solution shall enable identification and processing of Actions, including the discovery of usage rules.	Met	■ The ISSN is designed to facilitate automated look-up and access to serial publications and their associated descriptions. ■ The ISSN has been implemented as an actionable identifier within the URN framework.
11. The solution shall enable identification and processing of Transactions, including the discovery of usage rules.	Met	■ The ISSN is designed for use in a wide range of business transactions including inventory management, order fulfilment, acquisition, cataloguing, circulation, interlibrary lending, and information retrieval.
12. The solution shall enable the identification of Users of Digital Items.	Met	■ The name of the body issuing the serial is a required data element for registration of the serial publication.

Requirement	Met/Not Met	Comments
13. The solution shall allow for conditional access to identifiers and descriptions.	Met	■ Access to the international register is controlled by the international registration authority. ■ Conditional access is permitted to a subset of the descriptive data associated with the ISSN for purposes of determining the identity of the serial to which the ISSN has been assigned.
14. The solution shall accommodate protection of integrity of identifiers, including graceful degradation.	Met	■ Administrative procedures ensure the integrity of the registration process. ■ The standard prohibits the re-use or alteration of an ISSN. ■ The international registration authority maintains the databases of all registrations (including descriptive data).
15. The identifier shall be globally-unique, and location-independent (i.e., the name should not depend on the physical location of the Digital Item).	Met	■ Within the domain administered by the ISSN registration authority, all assignments are unique. ■ The ISSN identifies only one publication; each serial is identified by only one ISSN. ■ The use of the preceding label "ISSN" or its equivalent in coded form serves to make the identifier unique on a global scale. ■ "ISSN" is registered as a Name Space Identifier within the URN framework defined by the IETF. ■ The ISSN identifies the serial independently of physical location.
16. The solution shall optionally provide a mechanism for distributed ID assignment and registration.	Met	■ The administrative structure for the ISSN registration system provides for a network of national and regional registration agencies as well as an international registration authority. ■ The international registration authority is responsible for overall governance, the certification of ISSN registration agencies, and the maintenance of a central database of all ISSN assignments and descriptive information ■ The ISSN registration agencies are responsible for processing registrant applications and maintaining databases of national or regional registrations.

Table 5: International Standard Textual Work Code (ISTC)

	Requirement	Met/Not Met	Comments
1.	The solution shall support interoperability with the other elements of MPEG-21 including support for technologies for privacy, rights management and event reporting.	Met	■ The ISTC is designed to facilitate business applications relating to the tracking of usage and the collection of royalties on behalf of rights holders through the unique identification of textual works.
2.	The solution shall provide for identification and description schemas for Digital Items which are intended to persist through the life of such Digital Items.	Met	■ The standard prohibits re-assignment or alteration of the identifier. ■ The standard requires the registration agency registering the work to maintain the identifier and its associated descriptive data in a database repository.
3.	The solution shall be scalable, persistent, efficient, flexible and extensible.	Met	■ The standard specifies segmentation of the ISTC into an agency element comprising three hexadecimal digits, a year element comprising four digits, a work element consisting of eight hexadecimal digits, and a check character.
4.	The solution should be of the toolbox or plug-in type.	Met	■ The specification for the identifier makes it amenable to implementation in applications of all types.
5.	The solution should accommodate and support existing ISO-standardised and other identification systems.	Met	■ The ISTC is currently at the working draft stage within ISO TC46/SC9/WG3.
6.	The solution shall allow for backward compatibility with upgrades.	Met	■ The ISO standards process effectively ensures backward compatibility of future revisions.
7.	The solution shall be able to identify the identification and description system used for the digital item.	Met	■ The standard requires eye-readable displays of the identifier to be preceded by the label “ISTC”. In digital form, the identifier can be identified as an ISTC through tagging or coding.

Requirement	Met/Not Met	Comments
8. The solution shall be able to identify the content type.	Met	■ The prescribed scope of application for the ISTC provides implicit identification of the item as a textual work (as defined in the standard). ■ The descriptive data required for registration provides more specific identification of the content type in accordance with prescribed categories.
9. The solution shall provide an efficient resolution system for links to related Digital Items, such as different versions, different manifestations of the same Digital Item, different names of the same Digital Item (e.g., aliases, nicknames), their elements, etc.	Met	■ The descriptive data required for registration requires identification of the work as a derivative of another textual work, if applicable, and a link to the related work that incorporates the ISTC assigned to the related work, if applicable, or the title and author (when available) of the related work.
10. The solution shall enable identification and processing of Actions, including the discovery of usage rules.	Met	■ The ISTC is designed to facilitate automated look-up and access to textual works and their associated descriptions.
11. The solution shall enable identification and processing of Transactions, including the discovery of usage rules.	Met	■ The ISTC is designed for use in a wide range of business transactions including the tracking of usage and the collection of royalties on behalf of rights holders.
12. The solution shall enable the identification of Users of Digital Items.	Met	■ The registration agencies maintain directories of ISTC registrants (i.e., the authors, agents, collecting societies, and publishers of the textual works).
13. The solution shall allow for conditional access to identifiers and descriptions.	Met	■ Access to registrant and descriptive data is controlled by the international registration authority and the ISTC registration agencies. ■ Conditional access is permitted to a subset of the descriptive data associated with the ISTC for purposes of determining the identity of the work to which the ISTC has been assigned.

Requirement	Met/Not Met	Comments
14. The solution shall accommodate protection of integrity of identifiers, including graceful degradation.	Met	■ Administrative procedures ensure the integrity of the registration process. ■ The standard prohibits the re-use or alteration of an ISTC. ■ The registration agencies maintain databases of all registrations (including descriptive data).
15. The identifier shall be globally-unique, and location-independent (i.e., the name should not depend on the physical location of the Digital Item).	Met	■ Within the domain administered by the ISTC registration authority, all assignments are unique. ■ The use of the preceding label "ISTC" or its equivalent in coded form serves to make the identifier unique on a global scale. ■ The ISTC identifies the work independently of any specific expression or manifestation of the work, and independently of physical location.
16. The solution shall optionally provide a mechanism for distributed ID assignment and registration.	Met	■ The administrative structure for the ISTC registration system provides for a network of registration agencies as well as an international registration authority. ■ The international registration authority is responsible for overall governance, the certification of ISTC registration agencies, and the maintenance of a central database of ISTC assignments and descriptive information. ■ The ISTC registration agencies are responsible for processing registrant applications and maintaining databases of registrations, including descriptive data associated with the identifier.

Table 6: International Standard Musical Work Code (ISWC)

Requirement	Met/Not Met	Comments
1. The solution shall support interoperability with the other elements of MPEG-21 including support for technologies for privacy, rights management and event reporting.	Met	■ The ISWC is designed to facilitate business applications relating to the tracking of usage and the collection of royalties on behalf of rights holders through the unique identification of musical works.
2. The solution shall provide for identification and description schemas for Digital Items which are intended to persist through the life of such Digital Items.	Met	■ The standard prohibits re-assignment or alteration of the identifier. ■ The standard allows the identifier to be associated with digital expressions and manifestations of the work using techniques such as encryption or watermarking.
3. The solution shall be scalable, persistent, efficient, flexible and extensible.	Met	■ The standard specifies a work identifier that is nine digits in length, in a range from 000000001 through 999999999 .
4. The solution should be of the toolbox or plug-in type.	Met	■ The specification for the identifier makes it amenable to implementation in applications of all types.
5. The solution should accommodate and support existing ISO-standardised and other identification systems.	Met	■ The ISWC is currently an ISO Draft International Standard (DIS), in the final voting stage.
6. The solution shall allow for backward compatibility with upgrades.	Met	■ The ISO standards process effectively ensures backward compatibility of future revisions.
7. The solution shall be able to identify the identification and description system used for the digital item.	Met	■ The standard requires eye-readable displays of the identifier to be preceded by the label “ISWC”. In digital form, the identifier can be identified as an ISWC through tagging or coding.
8. The solution shall be able to identify the content type.	Met	■ The prescribed scope of application for the ISWC provides implicit identification of the item as a musical work (as defined in the standard). ■ The descriptive data required for registration provides more specific identification of the content type in accordance with prescribed categories.

Requirement	Met/Not Met	Comments
9. The solution shall provide an efficient resolution system for links to related Digital Items, such as different versions, different manifestations of the same Digital Item, different names of the same Digital Item (e.g., aliases, nicknames), their elements, etc.	Met	■ The descriptive data required for registration requires identification of the work as a derivative of another musical work, if applicable, and a link to the related work that incorporates the ISWC assigned to the related work, if applicable, or the title of the related work.
10. The solution shall enable identification and processing of Actions, including the discovery of usage rules.	Met	■ The ISWC is designed to facilitate automated look-up and access to musical works and their associated descriptions.
11. The solution shall enable identification and processing of Transactions, including the discovery of usage rules.	Met	■ The ISWC is designed for use in a wide range of business transactions including the tracking of usage and the collection of royalties on behalf of rights holders.
12. The solution shall enable the identification of Users of Digital Items.	Met	■ The registration authority maintains a central database of ISWC registrants (i.e., the rights societies representing the creators of musical works).
13. The solution shall allow for conditional access to identifiers and descriptions.	Met	■ Access to registrant and descriptive data is controlled by the international registration authority and the ISWC registration agencies. ■ Conditional access is permitted to a subset of the descriptive data associated with the ISWC for purposes of determining the identity of the work to which the ISWC has been assigned.

Requirement	Met/Not Met	Comments
14. The solution shall accommodate protection of integrity of identifiers, including graceful degradation.	Met	■ Administrative procedures ensure the integrity of the registration process. ■ The standard prohibits the re-use or alteration of an ISWC. ■ The regional/sectoral registration agencies maintain databases of all registrations (including descriptive data). ■ The international registration authority maintains a central database of works that potentially could be registered by two or more ISWC registration agencies. ■ The standard incorporates a check character as a means of ensuring automatic detection of transcription errors.
15. The identifier shall be globally-unique, and location-independent (i.e., the name should not depend on the physical location of the Digital Item).	Met	■ Within the domain administered by the ISWC registration authority, all assignments are unique. ■ The use of the preceding label "ISWC" or its equivalent in coded form serves to make the identifier unique on a global scale. ■ The ISWC identifies the work independently of any specific manifestation of the work, and independently of physical location.
16. The solution shall optionally provide a mechanism for distributed ID assignment and registration.	Met	■ The administrative structure for the ISWC registration system provides for a network of regional or sectoral registration agencies as well as an international registration authority. ■ The international registration authority is responsible for overall governance, the certification of regional and sectoral registration agencies, the allocation of blocks of ISWC to regional and sectoral registration agencies, and the maintenance of a central database of works that potentially could be registered by two or more ISWC registration agencies. ■ The regional and sectoral registration agencies are responsible for processing applications and maintaining records of assignments, including descriptive data associated with the identifier.

4. Collaboration

The various organizations submitting this response are involved both jointly and in cooperation with other stakeholders in the content industries in a number of efforts designed to facilitate interoperability in a networked environment. It is largely as a result of those collaborative efforts that the schemas submitted in this response have been adopted as key elements in a wider range of industry-developed identifiers such as the Serial Item and Contribution Identifier (SICI) and the Book Item and Component Identifier (BICI). Currently the organizations responsible for development of the International Standard Audiovisual Number (ISAN) are working with organizations in the broadcasting industry—the Society of Motion Picture and Television Engineers (SMPTE) and the European Broadcasting Union (EBU)—to develop a Universal Program Identifier (UPID). The UPID adds a further level of granularity for the identification of audiovisual productions, adding an extension to the identifier for the audiovisual work (the ISAN) to identify broadcast content at a more precisely defined "version" level, to support automated program scheduling, queuing, and recording of broadcasts. Efforts of this kind serve not only as the basis for more efficient modes of interoperability across the content industries, but also as a means of achieving mutual goals with a minimum of duplicative effort.

On a broader front, all six of the organizations submitting this response (CISAC, FIAPF, IFPI, the International ISBN Agency, the ISO working group developing the ISTC, and the ISSN International Centre) are working together to address a number of common issues related to interoperability. Over the course of the past twelve months, a number of meetings have been held to define the issues and to map out a collaborative approach to addressing them. The group is currently planning a three-stage program of work.

The first stage is centred on an analysis of functional requirements, beginning with the development of a business architecture along the lines sketched out in Annex E of the MPEG-21 Draft Technical Report. The development of the business architecture will involve an analysis of intra- and inter-industry business transactions between the five groups of stakeholders represented by the participating organizations: creators, producers, distributors, registration authorities, and rights management administrators. The analysis will focus on three broadly defined business functions that are central to the content industries: production, distribution, and the management and protection of intellectual property rights. The resulting business architecture will provide the context for the development of an information architecture designed to highlight functional requirements for the design and application of identifiers and descriptors for key entities involved in the designated business transactions and to serve as a framework for assessing the schemas currently defined against those requirements.

The second stage will address issues related to the support of interfaces between different identification and description schemas in an open, multimedia, networked environment. The issues addressed will include the feasibility of establishing a common set of principles and/or rules for the design and application of identification and description schemas to be adhered to across the content industries; an assessment of the potential for developing a common vocabulary, or alternatively a "translation" mechanism, for key data elements to facilitate interoperability; and the need for a standard format for the transport of identification and description data in a networked environment.

The third stage of work will address issues related to the extension of existing schemas to cover functional requirements that are currently not met, and the implementation of mechanisms to make identification and description schemas both "actionable" and "secure" in an operating environment. The issues addressed will include the coverage of additional classes of property

such as images and performances; the need for extended levels of "granularity" in the application of identifiers; the requirement for effective resolution services to link the identifier directly to the digital item identified; the need for authentication services to validate transactions; and the need for mechanisms to restrict access to identifiers and descriptive data to authorized users.

5. Interaction with other Elements of the Multimedia Framework

The schemas for Digital Item Identification and Description submitted in this response are central to the multimedia framework as a whole and are designed to interact with all other elements of the framework outlined in the Draft Technical Report. The key aspects of that interaction are highlighted below.

Digital Item Declaration

- Digital Item Declaration, as outlined in the Draft Technical Report, provides a uniform and flexible abstraction and interoperable schema for declaring digital items. As such, it is designed to function as a universally interpretable "envelope" for communicating data provided through Digital Item Identification and Description.

- Within a fully interoperable multimedia framework, the schema adopted for Digital Item Declaration must accommodate and support full articulation of the digital item identifiers and descriptors defined in domain-specific terms in the schemas submitted in this response as well as in other relevant industry schemas currently in place or under development.

- It is essential that the model underlying the representation schema adopted for Digital Item Declaration encompass at an abstract level the full scope and complexity of the models underlying the definition of entities and relationships in the relevant domain-specific schemas for Digital Item Identification and Description. (See section 6 below for an assessment of the potential for interfacing schemas for Digital Item Identification and Description with the schema for Digital Item Declaration proposed in Working Draft N3825.)

Content Representation

- Content Representation, as outlined in the Draft Technical Report, provides technology capable of efficiently representing a large range of data types and types of content in an efficient, scalable, error resilient, interactive, synchronous, and multiplex manner.

- The schemas for Digital Item Identification and Description submitted in this response provide, in part, a mechanism for describing the types of content embodied in the digital items identified and described.

- Content descriptors provided by these schemas—through incorporation into the schema adopted for Digital Item Declaration—serve to make information required by the technologies supporting Content Representation explicit and actionable.

Content Management and Usage

- Content Management and Usage, as outlined in the Draft Technical Report, provides the interfaces and protocols that enable creation, manipulation, search, access, storage, delivery, use, and reuse of content across the content distribution and consumption value chain.

- The schemas for Digital Item Identification and Description submitted in this response provide the "hooks" that are essential for the efficient operation of the interfaces and protocols supporting Content Management and Usage for the wide range of materials encompassed in the domains in which the schemas are employed.

- The identifiers defined in these schemas expedite search, access, storage, and delivery routines; they also serve as an efficient mechanism for monitoring and controlling use and reuse.

- The descriptors defined in these schemas provide the Content Management and Usage interfaces and protocols with the data they require to process a wide range of searches; they also provide those interfaces and protocols with the data required to establish parameters for storage, delivery, and use of the associated digital item.

Intellectual Property Management and Protection

- Intellectual Property Management and Protection, as outlined in the Draft Technical Report, provides a framework for expressing rights, interests in, and agreements relating to digital items, and managing and protecting those rights, interests, and agreements across a wide range of networks and devices.

- The identifiers and content descriptors provided by the schemas for Digital Item Identification and Description submitted in this response—through incorporation into the schema adopted for Digital Item Declaration—serve to facilitate the management of rights, interests, and agreements pertaining to a wide range of intellectual property (audiovisual works, musical works, textual works, audio recordings, music video recordings) as well as commercial interests in products embodying intellectual property (monographic publications and serial publications).

- The identifiers defined in these schemas, together with identifiers defined in other schemas in which they function as constituent elements (e.g., UPID, BICI, SICI), facilitate the accurate tracking of rights, interests, and agreements and corresponding use at multiple levels of granularity.

- The relationships expressed through the descriptive data defined in these schemas serve as an efficient mechanism for conveying the complex legal and commercial relationships between digital items, the underlying property rights embodied in those items, and rights owners and administrators that are integral to the effective management of intellectual property in a multimedia environment.

Terminals and Networks

- Terminals and Networks, as outlined in the Draft Technical Report, provides the technology to support interoperable and transparent access to content across networks and terminal installations.

- The identifiers and descriptors defined in the schemas for Digital Item Identification and Description submitted in this response—through incorporation into the schema adopted for Digital Item Declaration—provide an efficient mechanism for verifying the identity of digital items accessed through networks and signalling properties of those items that may have a bearing on transport, access, and display across networks and terminals.

Event Reporting

- Event Reporting, as outlined in the Draft Technical Report, provides a standardized set of metrics and interfaces with which to describe the temporally unique events and interactions that occur within the multimedia framework.

- The identifiers defined in the schemas for Digital Item Identification and Description submitted in this response provide an efficient, reliable, and persistent mechanism for relating a specific digital item registered in one or more of a multiplicity of domains to all transitory actions and transactions associated with that item.

- The descriptors defined in these schemas provide a further level of specification for each registered digital item that can be used to support multifaceted statistical analysis of actions and transactions across the full spectrum of the framework.

6. Interface with the Digital Item Declaration Schema Proposed in N3825

A definitive assessment of the potential interface between the schemas submitted in this response and the schema for Digital Item Declaration proposed in the Working Draft produced for the Multimedia Description Schemes (MDS) Group is impossible at this stage, given the incomplete nature of the Working Draft. The key points in the Working Draft on which clarification is required before any final assessment of the interface potential can be made are as follows:

1. Clarification is needed on the relationship of the element defined as *item* in the abstract model for Digital Item Declaration proposed in the Working Draft to the term "Digital Item" as defined in the MPEG-21 Draft Technical Report. In the proposed abstract model, *item* is defined as "a grouping of sub-items and/or components." A further distinction is made between *items* that qualify as *entities* (i.e., logically indivisible works containing no sub-items) and *items* that qualify as *compilations* (i.e., works composed of potentially independent sub-parts). In Annex A of the MPEG-21 Draft Technical Report, on the other hand, "Digital Item" is defined as "a structured digital object with a standard representation, identification, and meta-data within the MPEG-21 framework." The definition in the Draft Technical Report notes further that the Digital Item is the "fundamental unit of distribution and transaction within [the MPEG-21 framework." At the logical level, the element *item* as defined in the Working Draft and the term "Digital Item" as defined in the Draft Technical Report do not appear to be equivalent. If, in fact, they are not intended to be synonymous terms, then the distinction between the two needs to be made explicit, especially if the word "item" is to be used for both.

2. In part, the ambiguity of the relationship between the element defined as *item* in the Working Draft and the term "Digital Item" as defined in the Draft Technical Report stems from a lack of precision in establishing the scope of the term "Digital Item." On a literal level, the first sentence in the definition is broad enough in scope to encompass not

only the *item* element in the abstract model proposed in the Working Draft, but the elements defined in that model as *container*, *component*, and *resource* as well. Each of those elements would appear to qualify as "a structured digital object with a standard representation, identification, and meta-data within the MPEG-21 framework." On the other hand, if the second sentence in the definition of the term "Digital Item" is intended to limit its scope, and the term "fundamental" is intended to mean "basic" or "smallest," then an argument could be made that the *resource*, as defined in the abstract model, is the only element that qualifies as a "Digital Item".

3. Clarification is also needed on the hierarchical relationships between the elements defined in the Working Draft. In the abstract model, *container* is defined as "a potentially hierarchical structure that allows *items* to be grouped." Likewise, *item* is defined in terms that allow it to function as a hierarchical structure for purposes of grouping sub-items. Given that the model allows an *item* to be a constituent element either of a *container* or of another *item*, the operative distinction between a *container* and an *item* becomes critical. The basis for that distinction, however, is not clear from the definitions in the abstract model.

4. The need for clarification on hierarchical relationships is evidenced further by apparent discrepancies between the relationships defined in the abstract model and the relationships reflected in the digital item declaration language (DIDL) proposed in the Working Paper. While the abstract model refers to *containers* only as structures allowing *items* to be grouped, CONTAINER (as the DIDL element corresponding to the *container* element in the abstract model) is defined as "a grouping of ITEMs and/or possibly other CONTAINERs." The latter statement, as well as the diagrams for the DIDL elements CONTAINER and ITEM, indicates that the model effectively allows for an indefinite chain of hierarchical relationships between a container, a sub-container, a sub-sub-container, etc., each of which in turn may be related to an indefinite chain of hierarchically related items, sub-items, sub-sub-items, etc. That makes it all the more critical to clarify the operative distinction between a *container* and an *item*.

5. At the conceptual or logical level, there is another major issue of concern emerging from the abstract model proposed in the Working Draft. All the elements defined in the abstract model appear to operate exclusively at the concrete level (i.e., they all appear to reference "objects" only as bit streams). Although that may be consistent with the definition of "Digital Item" in the MPEG-21 Draft Technical Report, and it may be an appropriate limitation of scope for Digital Item Declaration *per se*, it does not appear to satisfy the overall objectives of the framework with respect to user requirements. Insofar as Intellectual Property Management and Protection and user requirements pertaining to the interests of rights owners and transactions involving those rights are key elements of the MPEG-21 framework, an inclusive model for Digital Item Declaration should provide more explicit reference to the abstract entities such as "work" that must be managed and protected from an intellectual property perspective. The model should also define more clearly the relationships between the abstract entities pertaining to intellectual property rights (the "objects" that must be managed and protected) and the concrete entities (*item*, *component*, *resource*) embodying those abstractions. If an inclusive model of that kind is deemed to fall outside the scope of Digital Item Declaration *per se*, there still needs to be developed an underlying model for the overall MPEG-21 framework that accounts for the identification and description of the intellectual property abstractions that have an identity distinct from and independent of any specific bit stream.

If ambiguities, discrepancies, and lacunae in the abstract model and digital item declaration language proposed in the Working Draft such as those noted above are not resolved, the implementation of interfaces between the Digital Item Declaration and Digital Item Identification and Description elements of the MPEG-21 framework will be highly problematic.

The schemas submitted in this response are designed to identify a broad range of entities. Some of those entities are relatively concrete in nature (e.g., monographic publications, serial publications, sound recordings); others are abstract (e.g., audiovisual works, musical works, textual works). If the model for Digital Item Declaration is not extended to encompass those abstract entities, or if the overall framework is not extended to accommodate the identification of such entities through the addition of a new element paralleling Digital Item Declaration, it is difficult to see how the framework could effectively support user requirements for Intellectual Property Management and Protection. Without an extension of the underlying model, at one level or another, it is also difficult to see how, in fact, Digital Item Identification and Description and Event Reporting would function with respect to those abstract entities that are critical for rights management and protection. Where would the "hooks" that are needed to manage and track usage of those entities be instantiated?

Effective implementation of schemas for Digital Item Identification and Description will also require unambiguous distinctions to be made between various elements defined in the abstract model for Digital Item Declaration. Otherwise, mapping identifiers and their associated descriptors to the Digital Item Declaration schema will be a hit and miss proposition. Will the identifier for a serial publication (i.e., the ISSN for the serial as a whole) qualify as the identifier for a *compilation* (i.e., will it be designated as an ID attribute for an ITEM), or will it be construed as an identifier for a *container* (and be designated as an ID attribute for a CONTAINER)? Will the identifier for a track on a sound recording (i.e., the ISRC for the sound recording contained on the track) qualify as a sub-item or *entity* (i.e., will it be designated as an ID attribute for an ITEM), or will it be treated as an identifier for a *resource* (and be designated as an ID attribute for a RESOURCE)?

The relationships between and among both the concrete and abstract entities defined in the schemas submitted with this response and reflected in the descriptions associated with them also play a critical role in facilitating access to, controlling usage of, and managing rights in those entities. The abstract model for Digital Item Declaration proposed in the Working Draft defines only the hierarchical relationships associated with containment of *items* in *containers* and *components* in *items*. Will all other relationships (e.g., derivation, modification, excerpting) be made explicit only through the *descriptors* that are bound with *item*? If that is the case, what are the performance implications for the various applications within a networked environment that use those relationships for processing purposes?

Users need to be assured that the overall MPEG-21 framework will incorporate a model and schema capable of supporting effective interfaces with Digital Item Identification and Description. They need to be assured that the framework will serve the full range of requirements associated not only with the management of bit streams but also with the identification and tracking of abstract entities for purposes of Intellectual Property Management and Protection and Event Reporting. If support of those requirements cannot be handled through Digital Item Declaration as currently conceived in the MPEG-21 framework, then the framework itself should be reassessed to determine if an additional element needs to be defined to handle abstract entities independently of their specific embodiment in bit streams.

7. Recommendations

The proponents recommend:

1. That the schemas for digital item identification and description submitted in this response be incorporated into the MPEG Multimedia Framework (MPEG-21) as integral components of that framework.

2. That MPEG establish a process for considering future identifier schemas for inclusion in the MPEG-21 Framework as and when they are approved as ISO standards and registration authorities are established to administer them.

3. That MPEG and the proponents work in concert on efforts to further enhance the effective use of these schemas in a networked environment.

4. That MPEG and the proponents collaborate in resolving outstanding issues related to interfacing schemas for Digital Item Identification and Description with the schema for Digital Item Declaration proposed in the Working Draft produced for the Multimedia Description Schemes (MDS) Group.