

cIDf Specification 2.0

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Content ID Forum (CIDf)

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CONTENTS

	1. Introduction.....	8
	1.1 Background	8
	1.2 Scope of the Content ID Forum	8
5	1.3 Organization.....	9
	2. Functional Analysis	11
	2.1 Introduction.....	11
	2.2 High Level View	11
	2.3 Reference model	16
10	2.4 Functional requirements	35
	3. The Technology to implement the practical use of ContentID.....	38
	3.1 Introduction.....	38
	3.2 Goals.....	38
	3.3 Overview of processing to issue ContentID	38
15	3.4 Distributed Content Descriptor	41
	3.5 Digital watermarking.....	59
	3.6 The Content ID Issuing Center (CIC) and the IPR database (IPR-DB).....	63
	3.7 Consumer.....	73
	3.8 Detection of illegal use	76
20	4. cIDf Metadata	80
	4.1 Functions of cIDf Metadata	80
	4.2 The Benefits of cIDf Metadata.....	81
	4.3 Usage of Content ID (Digital Item ID and CIDCMN)s	82
	4.4 Overview of cIDf Metadata.....	82
25	4.5 cIDf Metadata Sets.....	83
	4.6 Detailed Metadata Attributes for the cIDf Specification.....	90
	4.7 Metadata Association.....	114

	4.8	cIDf Metadata Expression.....	116
5.		<i>cIDf Registration Authorities and cIDf Identifier Resolution.....</i>	130
	5.1	Introduction.....	130
	5.2	Definition of Terms	130
5	5.3	The Relationship between the Registration Authority and the Content ID Management Center (CIC).....	130
	5.4	cIDf Resolution.....	134
	5.5	The CIDCMN/Handle Identifier Relationship.....	138
	5.6	Handle Metadata for the cIDf Specification.....	141
10	5.7	Resolution Server System Architecture.....	142
6.		<i>Conclusion.....</i>	144
	6.1	The Approach to cIDf Specification Conformity	144
	6.2	Prototype Experiments	147
	6.3	Example	147
15	6.4	Study in future.....	147
	6.5	Intellectual Property Rights (IPR) Issues	147

Foreword to cIDf specification Ver. 2.0

5 CIDf Specification ver1.1 was thoroughly revised before its publication about one year ago. Unfortunately, the circumstances surrounding both national and international digital content distribution have experienced significant changes. It is becoming more complex and diverse with related issues like privacy of personal information and Internet shopping.

10 Content ID Forum (“cIDf”) has, since its inception three years ago, anticipated the need to prepare for changes, and consistently has put forward a framework in which the identifier (content ID) assigned to digital content is to be a necessary infrastructure. CIDf has conducted energetic activities including setting and revising the technical specifications, holding fruitful discussions with many standards bodies around the world, submitting proposal to International Organization for Standardization activities to raise public awareness, and so on.

15 For example, in the past year cIDf has elicited cooperation with the CIDf-RA Prototype Experiments which demonstrates the effectiveness of content ID on a national scale. Remarkable results have been obtained even as the issues to be solved in the future have been clarified. As a result of these efforts, content ID is beginning to gain the gradually understanding of those involved. We note that the realities of the distribution of digital content are far from ideal for cIDf.

Under the circumstances, cIDf made significant changes in policy on March, 2003.

20 First, the previously unified attribute called “Content ID” was separated into a unique identifier (cid) and metadata sets. The identifier posed by cIDf could be combined with metadata sets by other standards bodies as needed. Further details and a discussion of the cID-RA Prototype Experiment are given in this specification.

After Sep. 2002, cIDf has been emphasizing the importance of promoting ContentID over the development of specification.

In conclusion, it is anticipated that Content ID will win understanding from many people in a broad range of fields and enter into worldwide use in the form of digital content distribution infrastructures.

Foreword to cIDf specification Ver. 1.1

More than two years have passed since Content ID Forum (“cIDf”) has been organized, and more than a year has passed since the formulation and publication of version 1.0 of the cIDf Specification that defines a framework for digital content identification.

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Meanwhile, the legal, technical and commercial conditions surrounding digital content distribution have dramatically changed, and the momentum for change is unrelenting.

10 In this atmosphere of change, the concept of embedding an identifier in digital content has gradually become accepted. In order to achieve *secure* distribution of digital content (thus protecting any intellectual property rights in the content) it is considered by cIDf to be an indispensable infrastructure requirement that content should be persistently associated with unique identifiers (Ids). With the persistent association of Ids with digital content, it is possible for Consumers to accurately acquire the digital content they want, and for effective usage measurement to be undertaken, thus efficiently controlling both digital content distribution and the intellectual property rights associated with the digital content. However, even given the clear benefits to digital content distribution provided by the persistent association of Ids with digital content, actual systems that have implemented the cIDf Specification have been few. Why?

20 The received wisdom is that the current legal, technical and commercial environment for the trading of digital content is extremely complicated and it is changing day by day. Consequently, the model or framework developed in the theoretical environment of the meeting room is not always effectively transferred to the real world.

25 CIDf is a group of business organizations, which are, or will be, engaged in digital content distribution on the network. Members of cIDf can therefore create, improve and develop the framework of digital content identification and subsequently utilize the results within their own business environments. Further, they are free to customize and develop the framework, thus adapting it to the specific requirements of the business sector they are engaged in.

30 With this in mind, the Industrial Forum was established as part of cIDf in 2001. The remit of the Industrial Forum is actively to promote the adoption of the cIDf Specification in real-life digital content distribution systems. A Rights Requirement Sub-Working Group has also been set up within the cIDf governance structure, group which aims to gather Rights Owners’ and Rights Administrators’ requirements for the system. Despite these focused efforts, however, the cIDf Specification has not yet been met with widespread system implementations.

Consequently, the Technology Working Group has been working on a revision of the Version 1.00 Specification from two different points of view. The first is to elaborate the existing Specification in more detail, in order that it may be used as a basis for prototyping. The second is to develop Specification guidelines so that the Specification can be applied to actual business implementations. This Specification Ver1.1 is the fruit of those activities.

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Nevertheless, even this specification contains many notes such as ‘temporary’ and ‘work in progress’. These will be defined clearly by continued gathering of requirements and subsequent prototyping.

10 To assist in this process, cIDf members are requested to examine the contents of this Specification ver.1.1 and the realities of digital content distribution both through theoretical studies and through fully implemented prototyping, and to discuss any differences they discover. By providing such conclusions to cIDf, it is anticipated that the Specification ver.1.1 can be developed to a point where it will be widely implemented in digital content distribution systems throughout the world.

15 The Specification can only develop from the input of experience. So let’s have your ideas!

1. *Introduction*

1.1 Background

Popularization of the Internet and progress in image, music and other content coding technology now make it possible to distribute digital content over networks easily and inexpensively. At the time when cIDf was first constituted 2 or 3 years ago, it was true to say that the revenue potential of network-based distribution had not yet been realized for the following reasons.

- (i) No single established platform existed which delivered digital content in a fully secure manner to the satisfaction of digital content Right Owners. Commonly, once digital content was available on a network, it could be copied and re-distributed without loss of quality and, more importantly, without legitimate authorization from the Right Owners, delivering no proper financial recompense to them.
- (ii) No effective mechanisms existed for charging recipients (whether for initial use or superdistribution) and the subsequent settlement of payments to all the legitimate participants in the digital content distribution chain.
- (iii) No mechanism existed which allowed a digital content Consumer to determine their rights in respect of particular items of digital content (in other words, to understand what they are allowed to do with the content they have received). Any business in the value chain, which wishes to arrange or adapt digital content for subsequent exploitation, had equally difficulty in determining the legitimacy of their activities.
- (iv) No mechanism existed which enabled the cross-referencing of uniquely identified digital content because the Ids and any associated metadata were located in many different databases.

All of these statements are still largely true today. Even though significant advances have been made, the difficulties outlined here remain to be effectively resolved.

1.2 Scope of the Content ID Forum

cIDf proposes that the introduction of a unique identifier for allocation to packages of digital content (whether containing one or many items of digital content) intended for distribution, called the “Content ID”. As part of a common global system, the Content ID would be persistently associated with the package of digital content through the use of watermarking or other technologies. CIDf believes that the persistent association of the Content ID with packages of digital content will provide far-reaching benefits to all participants in the digital content distribution chain. In particular:

- (i) It will be possible to determine the rights and permissions a Consumer of a package of digital content

- enjoys in that digital content. (**Rights Verification**)
- (ii) It will be possible for Rights Owners to receive appropriate compensation whenever their items of digital content are exploited in any way through a distributed package of digital content. (**Royalty and Fee Allocation Systems**)
- 5 (iii) It will provide a mechanism that enables the collection of digital content distribution usage aggregation records used for a variety of purposes including marketing, royalty collection and other analyses (analogous to a **Bar-code**).
- (iv) Illegal exploitation of digital content can be more easily detected (**Watermark and Content ID-Detection – using “Net-Watcher” technologies**).
- 10 (v) It will provide the common identification mechanism to enable the retrieval and cross-referencing of metadata relating to all packages of digital content where this is located in different databases (an essential part of the infrastructure for a content **Portal Site**).

The Content ID will thus help to eliminate the concerns that currently make Rights Owners hesitate in permitting the distribution of their digital content over networks. Therefore it should be possible for high quality and exciting digital content to be made available over networks, fostering a new type of business, “digital content commerce”. CIDf are sure that digital content commerce, facilitated by the widespread implementation of the Content ID, will become a major revenue generating industry in the very near future.

20 The main objective of cIDf is to standardize the Content ID and its associated metadata. CIDf intends, as a first step, to make the Content ID and its associated metadata a *de facto* standard in Japan. However, cIDf will, in developing the Content ID and its associated metadata as a standard, take into account other global standardization activities in order to ensure that the Content ID and its associated metadata remain consistent with the international standards framework. In addition, joint discussion and prototype experiments to ensure interoperability between different identification systems are being carried out in cooperation with other standardization bodies on a global scale.

CIDf encompasses the full range of media types including audio (speech/music), images (still and moving pictures), computer graphics, digital maps, and documents, indeed all (multimedia) digital content that can be created from any combination of these and other media types. Therefore the technical and commercial requirements for the copyright and digital content management of media of all types are being continuously studied as a part of on-going work.

1.3 Organization

35 The cIDf governance consists of a President, a Board of Directors, a Secretariat and a number of Working Groups (WGs). At the current time, cIDf has five active WGs: Technology WG; Category WG; Administration and

Operations WG; Legal WG; and International WG. In addition Sub-Working Groups (such as the Rights Requirement Sub-Working Group mentioned in the foreword) and Ad-Hoc Groups are set up by Working Groups, as a specific requirement is identified. The members of these are specialists in the specific discipline that forms the subject matter of the terms of reference of the Sub-Working Group or Ad-Hoc Group. CIDf also has created the Industrial Forum (IF) the purpose of which is to formulate detailed specifications and prototype experiments for each different market sector.

1.3.1 Scope of Each Working Group

- (i) The Technology Working Group is responsible for key “elemental” technologies such as watermarking and XML
- 10 (ii) The Category Working Group is responsible for all aspects of the format of the Content ID Specification (identifier and metadata) and co-ordination with other standards organizations.
- (iii) The Administration and Operations Working Group is responsible for relationships and liaisons with international identification systems as well as for the establishment of the Registration Authority and the necessary formal organizational structure to support the implementation of the cIDf Specification; this Working Group has a specific sub-group working on the Registration Authority issue.
- 15 (iv) The Legal Working Group studies the impact of issues relating to copyright legislation on the cIDf Specification.
- (v) The International Working Group promotes international activities and seeks collaborations with overseas (non-Japanese) organizations.

20 1.3.2 The Scope of Industrial Forum

The cIDf Industrial Forum (cIDf-IF) was established to facilitate the development of solutions to a variety of specific problems in cooperation with the WGs. In addition the cIDf-IF, in co-operation with Task Groups (TG) set up for each digital content sector, was tasked with attempting to gather detailed requirements and subsequently create prototype implementations for each of the TG’s. This work has been based on the cIDf Specification and has the additional benefit of being a mechanism for the dissemination and promotion of the cIDf Specification.

All participants in the digital content distribution chain require the definition of a seamless network environment, from the first production of a Work protected by intellectual property rights in the form of an item of digital content to its final receipt on a digital terminal as part of a package of digital content. The cIDf-IF discussions focused on an integrated solution, providing a complete system of rights management and digital content distribution through the implementation of the cIDf Specification in every aspect of its architecture.

2. *Functional Analysis*

2.1 Introduction

This section describes the modeling of digital content distribution and then the functional requirements obtained by studying the models.

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Section 2.2 presents the high-level issues, goals and solutions contained in the cIDf Specification for digital content distribution.

Section 2.3 explains the reference model adopted by cIDf. It provides a common framework for discussion of the functional requirements. The section begins with a definition of the terminology, followed by a description of the flow of digital content distribution explained from the viewpoint of different layers: the copyright layer, the system layer, and the other rights layer.

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□ **The copyright layer** provides the framework for the players who are in any way involved in the ownership, administration or exploitation of copyright digital content.

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□ **The system layer** provides the framework for the systems used by the various players in the copyright layer and,

□ **The “other rights” layer** provides the framework for intellectual property, such as patents and trademarks, not covered by *copyright* legislation.

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It is anticipated that the reference model will be further developed to include businesses associated with software. Section 2.4 describes the functional requirements of the various players in the digital content distribution chain. The requirements of each player in the different layers of the reference model are set out first, and then the means by which these functional requirements can be achieved are listed.

2.2 High Level View

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This section examines the present situation surrounding digital content distribution to elucidate the problems; the goals and solutions are then set out.

2.2.1 *Perceived problems*

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Different players have different views about how packages of digital content can best be distributed in current markets. In light of this, the current problems of digital content distribution are first discussed by comparing them to the historical trading of physical goods.

In the trading of physical goods, a written agreement between the two (or more) players involved in the

transaction dictates the basis of the trade and is legally enforceable. Such agreements frequently use mutually-understood terms that have obtained their precise meaning through common usage over many years. In other respects, terms and conditions are determined freely through negotiations between the parties. Once an agreement is in force, the rights and obligations it bestows on the parties are normally executed in accordance with its terms. The agreement terms usually contain provisions whereby compliance can be validated. Another important aspect of physical trading agreements is that the privacy of the agreement, especially pricing, is fairly well protected.

This contrasts significantly with agreements for the trading of digital content. There is neither an established set of well-defined terms for digital agreements, nor, with some exceptions, a basis for their legal enforceability. That means the parties can seem to determine the terms and conditions of agreements, and the flexibility of the networked environment, particularly the lack of physical constraints, will require equally terms and conditions in a digital agreement, those which are considerably more complex than those for the physical environment. While the rights and obligations of digital content agreements can be fulfilled even if parties are located on opposite sides of the world, mechanisms for the validation of the fulfillment of them are not readily available (in part due to issues of distance). Privacy at all levels, including in trading agreements, is also not well protected at present.

These problems can be ascribed to the fact that the network environment has developed so fast that only a few of the functions necessary for electronic commerce have been developed; the rest are still unavailable. In other words, although a *distribution* channel for digital content has been constructed, the infrastructure to support it has yet to be put in place. However, an infrastructure can be envisaged whereby all agreements relating to the trading of digital content could be processed in an automated and integrated way, leading to a superior rights and digital content management environment in terms of improved accuracy, reduced cost and faster transaction processing, regardless of the physical distances involved.

2.2.2 *The Principles of cIDf*

The purpose of cIDf was to resolve the issues have just described: the lack of common understanding of the terms of digital agreements; the lack of privacy in those agreements; and the lack of automated control over performance of the agreements. However, cIDf further set for itself three rules against which any solution needs to be judged.

The first of these might be simply expressed as “any rights and obligations regarding the creation, management and exploitation of digital content must be applicable equally to all.” This might be called “the rule of neutrality.” For example, the rule of neutrality ensures that:

- anyone can access packages of digital content or metadata about the packages of digital content including, for example, a description of the content, or identification of the original Creator or Rights

Owner, on condition that they follow certain rules;

- anyone can exploit a package of digital content within a particular digital terminal environment in accordance with the permissions granted by the various players in the digital content distribution chain.

5 The ability of the players to develop business models, technical infrastructure solutions and determine business relationships freely without any form of constraint other than appropriate legal frameworks might be called the “rule of independence.” For example, the rule of independence embraces:

- the ability for the players to determine licensing agreements, distribution methods or sales methods freely;
- the ability to set sales prices flexibly in accordance with specific business requirements.

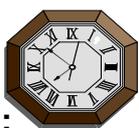
10 All participants in the digital content distribution chain must be able, with a minimum of delay, to undertake and, where appropriate, verify digital content transactions. This might be called “the rule of transparency.” The rule of transparency ensures, for example, that:

- rights and obligations are defined in an accurate and timely manner;
 - any exploitation agreement between the final Distributor and the Consumer is made in accordance with the constraints of the Distributor’s digital content agreement with the upstream players such as the
- 15 Aggregator or the Rights Owner.

The principles of cIDf have been, in short, to create a specification conducive to meeting the requirements of these rules of neutrality, independence and transparency.

2.2.3 Goals

20 Most events which take place in the world can be defined and described using “five Ws and one H”: WHEN, WHERE, WHY, HOW, and WHO did WHAT. The unique identification of the 5 Ws and 1 H should ensure



When:
IDs identifying a time (standard 24 hour time measurement)



Where:
IDs identifying a place (standard or proprietary IDs e.g. GPS data)



Who:
IDs identifying individuals (e.g. standard or proprietary IDs e.g. social security numbers)



How:
IDs identifying the action by which a purpose is achieved (only proprietary terms exist e.g. copy, replay)



What:
IDs identifying all or part of an item of digital content (standard or proprietary IDs e.g. Content ID, ISRC)



Why:
IDs identifying the purpose of use (only proprietary terms exist e.g. “educational”, “private”)

effective management of rights in the digital content distribution environment. For example, WHEN and WHERE identifiers such as the unique identification of time or a network address are available. To identify WHAT, for example all or part of a sound recording as item or package of digital content, the ISRC code has been introduced.

5 It is desirable that an event is described in such a way that it can be uniquely identified and that each uniquely described and identified event behaves in a predictable way on any digital terminal. An ideal solution that meets this requirement is the creation of a system that expresses an event based on a standard identification system. If such a regime is properly implemented, it will meet the requirements of the rules of neutrality, independence, and transparency.

10

Ideal as this solution is, it cannot be realized overnight. It would be anticipated the following step-by-step development:

Step 1: A common approach to specifying the attributes of items and packages of digital content is established. The identifier for uniquely identifying packages of digital content (containing items of digital content) and their associated metadata is called the “Content ID”.

Step 2: A common language or dictionary in machine readable form is developed, and it enables the expression of rights and agreements relating to the creation and exploitation of intellectual property in the form of items or packages of digital content for distribution.

Step 3: Development of processes and systems whereby the execution of an event written in the common language described above can be controlled through the devices used in the storage, distribution and reception of items or packages of digital content.

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Step 4: The common language defines the rights to each individual copyright work or works protected by intellectual property law, works which become items of digital content and consequently a constituent part of a package of digital content, and thereby leads to the establishment of the legal status of each those digital content.

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Step 5: The establishment of technical control over exploitation accelerates the development of the electronic distribution of packages of digital content.

CIDf has made the achievement of this goal its primary target through the development of the cIDf Specification.

2.2.4 *The scope of rights targeted by cIDf*

The scope of the rights encompassed by the cIDf Specification not only includes copyright works but also other content protected by intellectual property law. This includes for example, patented software, trademarks, and creators' moral rights. The Specification focuses on the management of items and packages of digital content in the networked environment. Although the model does make some reference to the management of individual copyright works or other IPR material, cIDf recognizes the need to undertake further work that defines solutions for further layers of granularity.

It is particularly important that this more granular analysis is undertaken because in the networked environment multiple forms of packages of digital content can be derived from the same copyright work (in the form of an item of digital content), and offered for exploitation and distribution in myriad ways. Consequently the copyright and digital content management infrastructure must recognize that the same copyright work in the form of an item of digital content may be licensed as a constituent part of a package of digital content to multiple Aggregators or Distributors and furthermore that Consumers will also be able to re-distribute the package of digital content.

Throughout this Specification, an item of digital content is assumed to be a sub-set of a package of digital content. However, this should not be taken to mean that an item of digital content always consists of a single Work (see Table 2.3.1). For example a package of digital content could be a television program, which itself consists of a number of different types of Works (among other things, text, music, sound recordings, excerpts from other television programs). In the cIDf Specification, these are referred to as "items of digital content" even though some of them consist of more than one Work (a sound recording consists of a musical work and a sound recording, both separately protected by Copyright Law). Therefore, within the Specification the term "item of digital content" can be referring to one or more Works and is only referred to in this way because it is upstream digital content for the package of digital content that is to be identified for distribution. In other words, a package of digital content may contain only one Work and is described as such only because it is the downstream entity in the process of digital content distribution. This highlights the fact that the cIDf Specification is identifying "manifestations" of Works rather than the Works themselves.

Similarly, any attempt to map the terminology used in cIDf to terminology in Copyright Law requires further study. Although some work has been undertaken in this area in the context of Japanese Copyright Law, it is recognized that, in the global networked environment, this is not sufficient for a meaningful mapping of terms.

2.2.5 *Control policy of cIDf*

The cIDf Specification does not seek to control or determine the attribute information contained in any IPR databases for any item or package of digital content. The attribute information for each item or package of digital content will be registered in IPR databases in accordance with the requirements of the registrant. CIDf will make no attempt to validate the correctness of the information or the originality or ownership of the registered item or package of digital content.

2.3 Reference model

5 This chapter describes a reference model that provides a common framework for discussing the functional requirements leading to the cIDf Specification. The focus of cIDf is the distribution and exploitation of packages of digital content in the networked environment. Therefore the parties who appear in the reference model are those who may own rights in Works in the form of items of digital content and those who may license or exploit the digital content.

10 The copyright layer of the reference model uses existing business terminology in common usage as a result of Japanese Copyright Law (although, as stated above, more mapping of global legislation terms is required to give this layer global meaning). However, it should be specifically noted that the concept of Editor/Arranger within the reference model can differ quite substantially from territory to territory giving rise to diverse legal consequences. It has not therefore been possible to generalize this part of the process and it may be different depending on the specific circumstances. In recognition of the fact that there are additional Rights Owners involved in digital content, such as owners of patents, trademarks, moral rights or data relating to financial statements or health records, another layer of “other rights” is included for discussion in the reference model.

15 The reference model consists of several hierarchical layers, including a layer for copyright and digital content management, a system layer for the services used by players involved in copyright and digital content management or distribution, and a layer for intellectual property other than copyright (See Figure 2.3.1).

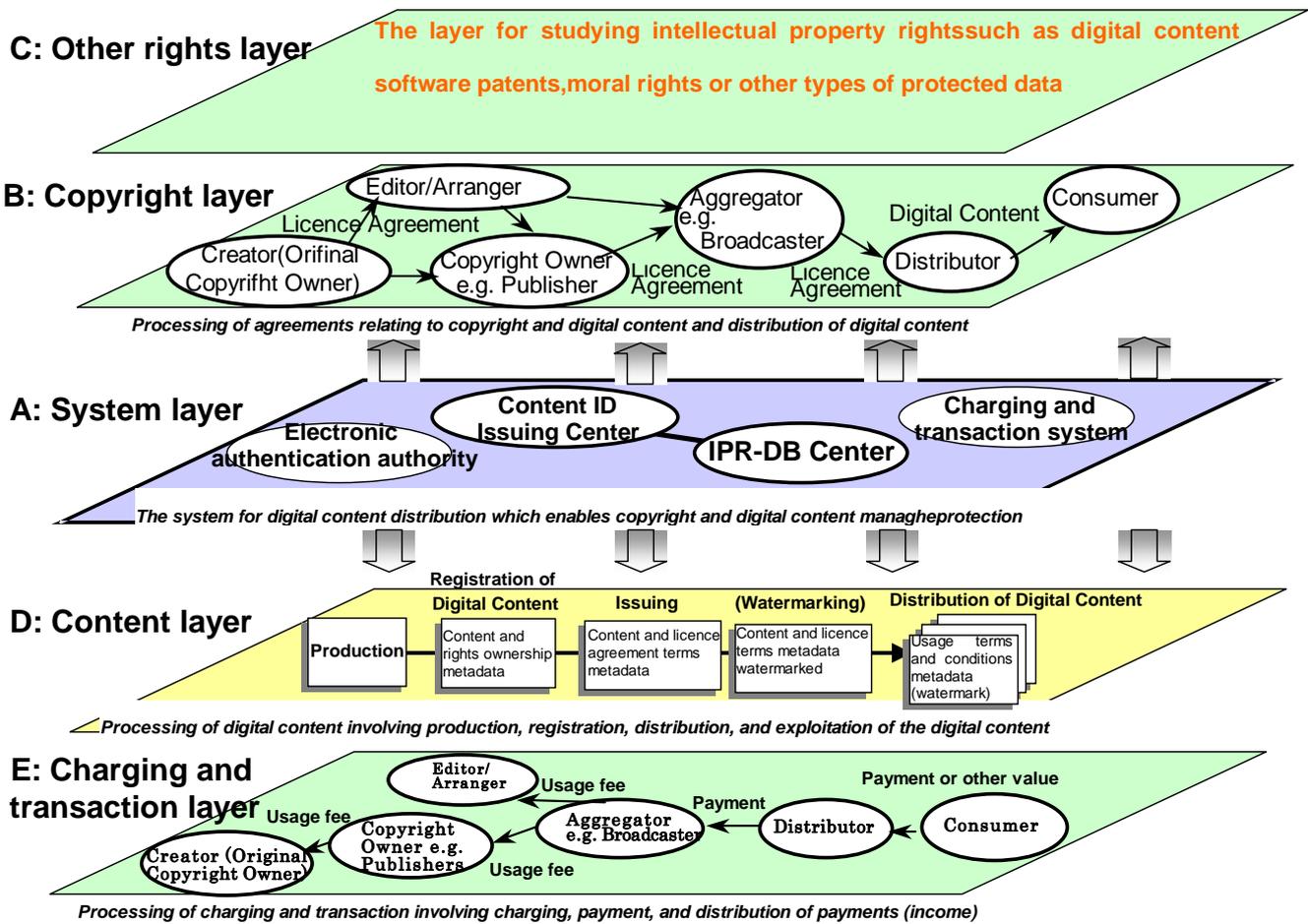


Figure 2.3.1 Layered structure of the reference model

2.3.1 Definitions of terms

The following tables define the terms used in the explanations of the process models that follow and in later chapters of the Specification. The first table identifies the players and “objects” in the Reference Model and the second table describes the types of data required to support the processes described.

Table 2.3.1 Definitions of players and other entities

Term	Definition
Copyright work	A work in which thoughts or sentiments are expressed in a creative way and which falls within the literary, scientific, artistic or musical domain
Work	An item protected by intellectual property rights
Item of Digital Content	Digital data stored in physical media containing one or more Work which is subject to intellectual property rights and which forms the upstream digital content for packages of digital content
Package of Digital Content	Digital data stored in physical media for the purposes of digital content distribution containing one or more Works which are subject to intellectual property rights
Digital Distribution Content Pair	Digital data stored in physical media for the purposes of digital content distribution containing one or more works which are subject to intellectual property rights and with which a metadata set (DCD – See Chapter 3) has been permanently associated.
Creator(s)	A person who creates a copyright work
Rights Owner	The Creator, or any person or organization who, through assignment, owns rights in all or part of a Work or Works
Rights Administrator	A person or organization who through a contract with the Rights Owner administers the rights in a Work or Works on their behalf
Editor/Arranger	A creator who creates a derivative or a new Work by editing or arranging an existing Work
Aggregator	A person or organization which takes one or many Works in the form of item(s) of digital content and produces them as a package of digital content for the purposes of distribution under license from the Rights Owner(s)
Distributor	A person or organization which distributes or exploits packages of digital content under license from the Rights Owner(s) and/or an Aggregator
Consumer	A person or organization which, in return for some form of value, is able to exploit a specified set of rights in a package of digital content
Content ID (Digital Item ID)	A temporary identifier assigned to an item of digital content
Content ID (CIDCMN)	A unique identifier assigned to a package of digital content for distribution and exploitation which is linked to attribute information uniquely describing the package of digital content

Term	Definition
Content ID Issuing Center	An agency of the Registration Authority authorized by the “Registration Authority” to issue cIDf Content Ids, on condition that they conform to the cIDf Specification.
IPR-DB Center	An organization which stores and manages in a database attribute information uniquely identifying and describing items or packages of digital content which have been granted a Content ID by a Content ID Issuing Center
Content ID Management Center	An organization which manages the functions of both a Content ID Issuing Center and an IPR-DB Center
Electronic Authentication Authority	A third party organization which authenticates the identity of all players in the digital content distribution chain
Charging and Transaction System	Third party organization with the function of invoicing, collecting and distributing royalties and fees in respect of transactions relating to items and packages of digital content
Registration Authority	An organization, which issues unique identifiers to Content ID Issuing Centers, determines the rules under which Content ID Issuing Centers operate and ensures that these rules are adhered to.

Table 2.3.2 Description of Data Types

Data Type	Overview	Example of attribute	Controller	Remarks
Content ID (Digital Item ID)	A temporary identifier assigned to a Work in the form of an item of digital content	Not specified	Content ID Issuing Center	
Content ID (Content ID Center Management Number – CIDCMN)	Unique number for identifying package of digital content for distribution	Group code, Content ID Center Number, CIC Internal Management Number, version number	Content ID Issuing Center	
Rights ownership metadata	Information on ownership of rights in an item or package of digital content	Rights information Detailed rights ownership information, etc.	Content ID Issuing Center	Registered at the time a Work or Works is/are manifested as item(s) of digital content or when one or more items of digital content are manifested as a package of digital content

Data Type	Overview	Example of attribute	Controller	Remarks
Digital content metadata	Metadata which describes each Work when distributed as an item of digital content or as part of a package of digital content	Content attributes Creator information Content type	Content ID Issuing Center	Registered at the time the item or package of digital content is produced
Rights Contracts Metadata	Metadata defining the terms and conditions of rights contracts between players in the digital content distribution chain	Permitted conditions for use or specific exclusions of use	Content ID Issuing Center	Registered at the time the item or package of digital content is to be made available for distribution and exploitation
Distribution Attributes	Metadata describing the terms and conditions under which an item or package of digital content may be exploited by a Consumer as specified by upstream players in the digital content distribution chain	Sales conditions Sales history information, etc. Units sold Period of sales Product number Date of sale, etc	Aggregator/ Distributor/ Trusted Third Party	Registered in accordance with license agreements between all the players in the digital content distribution chain

2.3.2 Reference model

A simple functional model illustrates the process from production of a Work in the form of an item of digital content through assignment of rights relating to it, the aggregation or arrangement of the Work to create a new item of digital content, the issuing of a license to exploit the item of digital content in the form of a package of digital content for distribution and exploitation, and the procedure for invoicing, collecting and distributing royalties or fees (See Figure 2.3.2). A single player may also perform multiple functions (See Figure 2.3.4). For example, a Rights Owner may, as well as having rights in the item of digital content, perform the function of the Aggregator and Distributor. Record companies, for example, frequently perform all three of these functions today.

B. Copyright layer

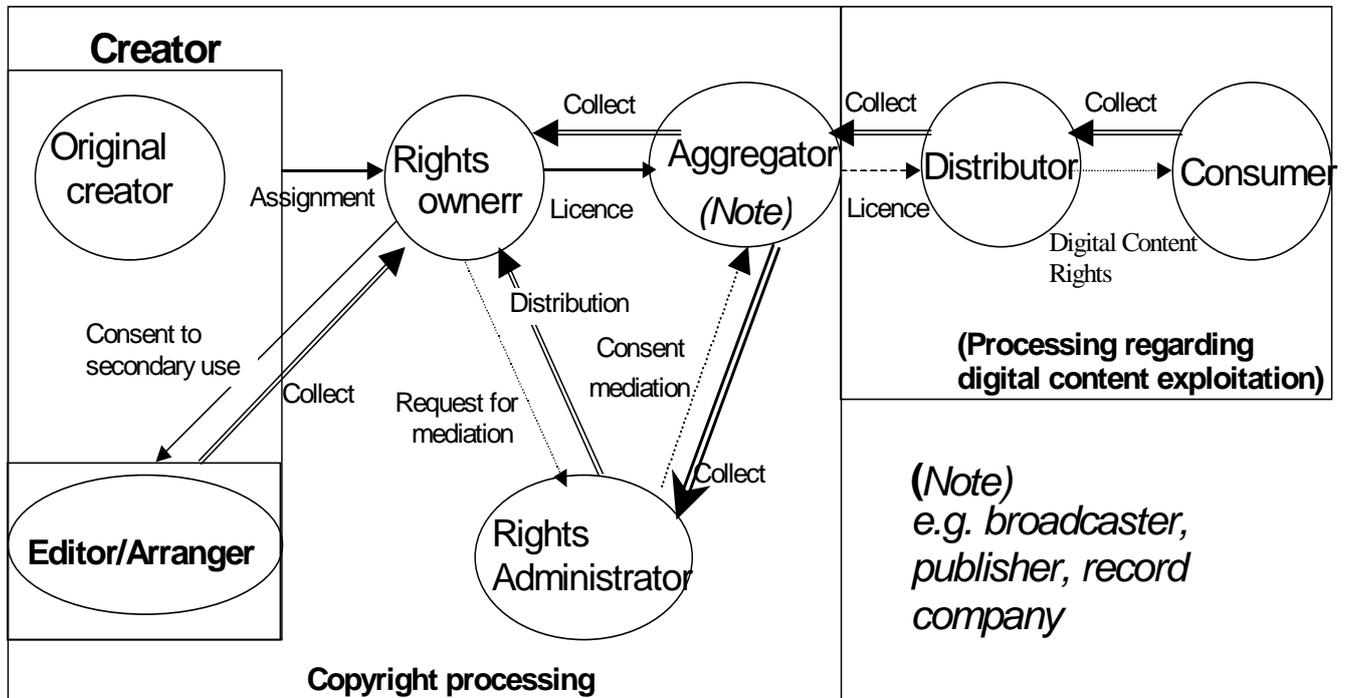
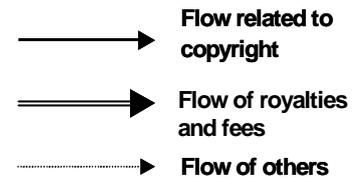


Figure 2.3.2 Flow of rights, royalties and fees in the copyright layer

5 In Figure 2.3.2 the flow of rights, royalties and fees relating to Works in the form of items or packages of digital content are modeled. There are two types of individual human Creators: an (original) Creator and an Editor or Arranger. The Editor/Arranger is given rights to edit or arrange the Work (and to issue it in the form of an item of digital content) by the Creator or the Rights Owner after a license negotiation, leading to the creation of a derivative Work (item of digital content).

10 The Rights Owner is the person or organization to whom rights have been assigned by the Creator. There may be cases where the Creator remains the Rights Owner and merely grants rights of administration to a third party (usually an organization rather than an individual). Alternatively the Creator may administer all the rights in his own works although this is unusual. They are therefore separated in the functional model. The Rights Owner grants a license for an Aggregator to use one or more Works in the form of item(s) of digital content to create a market offering in the form of a package of digital content. The license may be granted through an intermediary Rights Administrator. The Rights Owner charges royalties or fees to the Aggregator either directly or via the Rights Administrator. In the case where there are multiple Rights Owners, the royalties or fees are distributed to each Rights Owner as appropriate.

15 Any processes which occur downstream of the Aggregator are as much a part of the rights management process as

5

all previous transactions. However, from a Consumers' perspective it may be viewed merely as the processing of transactions relating to the exploitation of packages of digital content. Consumers transfer value, which may or may not be money, in respect of the package of digital content either directly to the Aggregator or through a Distributor. Examples of Aggregators are Internet portals, broadcasting organizations, publishers and recording companies.

B. Supplement to the copyright layer

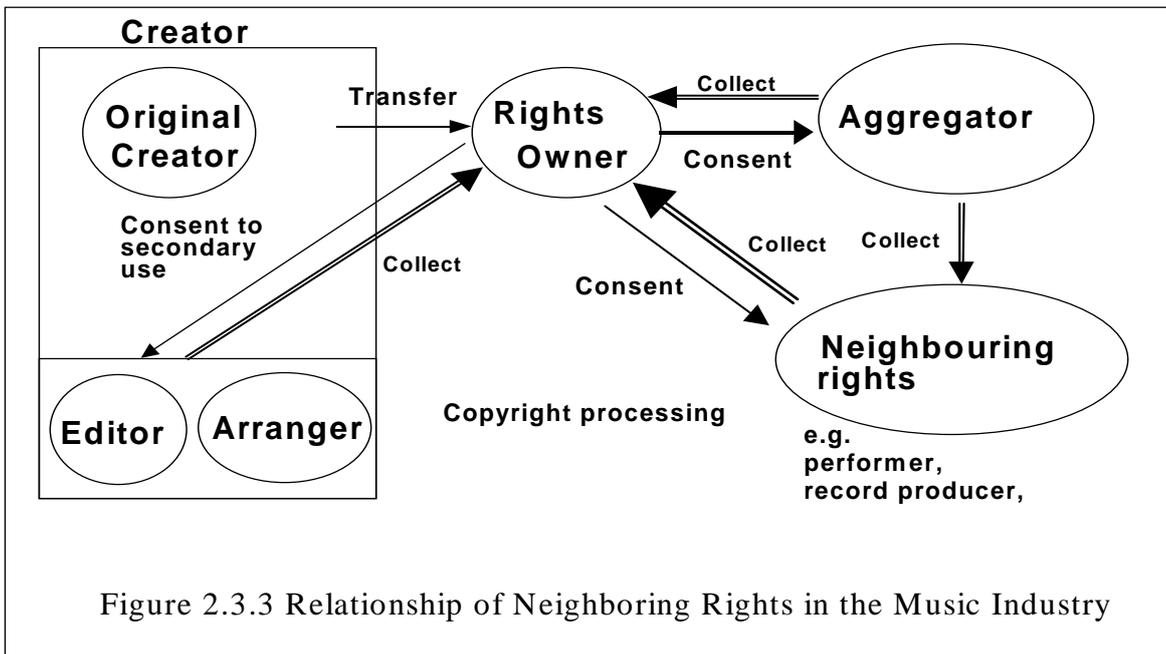
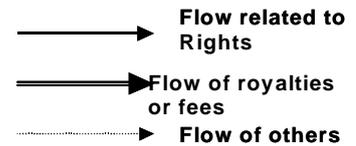


Figure 2.3.3 Relationship of Neighboring Rights in the Music Industry

10 Figure 2.3.3 shows the relationship that can exist between Rights Owners and Neighboring Rights Owners. This is most commonly seen in the music industry. Looked at in this context this diagram shows the relationship between the Rights Owner of musical works, the Aggregator and the owner of the Neighboring Rights of performers and sound recording producers. In this case the owner of the Neighboring Rights is in a similar position to the Rights Owner and receives royalties or fees from the Aggregator. This concept appears in Japanese and other legislation but is not common to all legislations throughout the world (most notably the USA, the UK and Australia).

B: Copyright layer

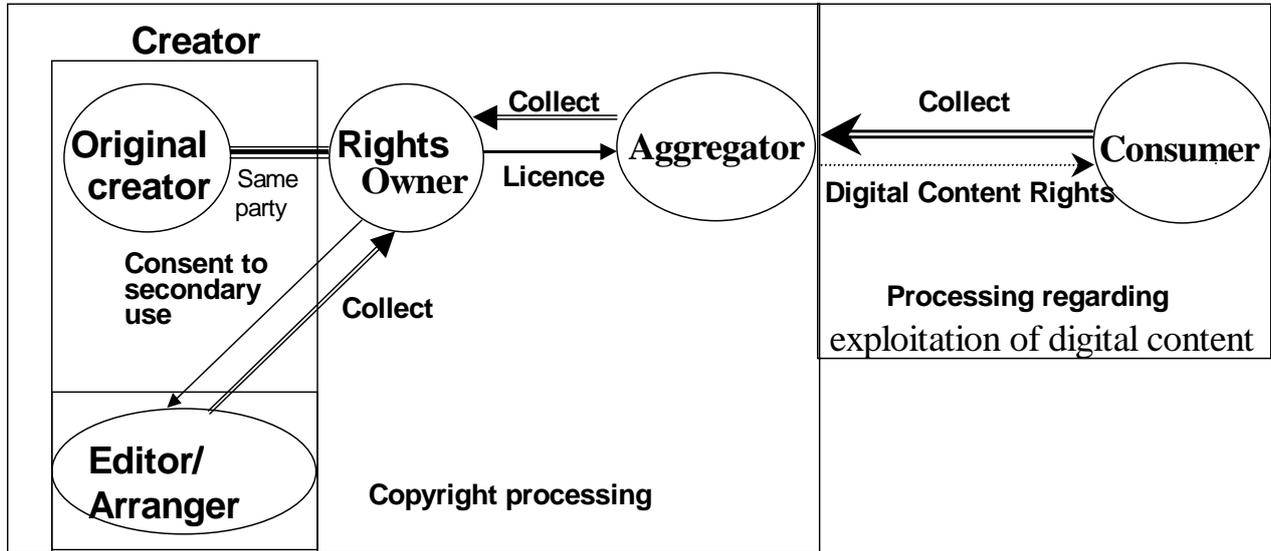
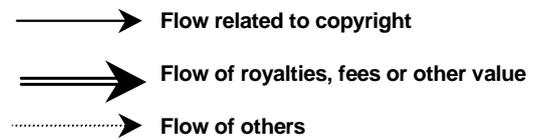


Figure 2.3.4 Rights Contract model in digital content distribution

Figure 2.3.4 illustrates a Rights contract model for the distribution of packages of digital content across the network.

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Contraction of the number of players in the chain can occur because, in network distribution, the Aggregator, for example, can also be the Distributor. In other words, Rights Owners aggregate their own items of digital content with other items of digital content to create packages of digital content for distribution. The process flow takes into account this common functional reality.

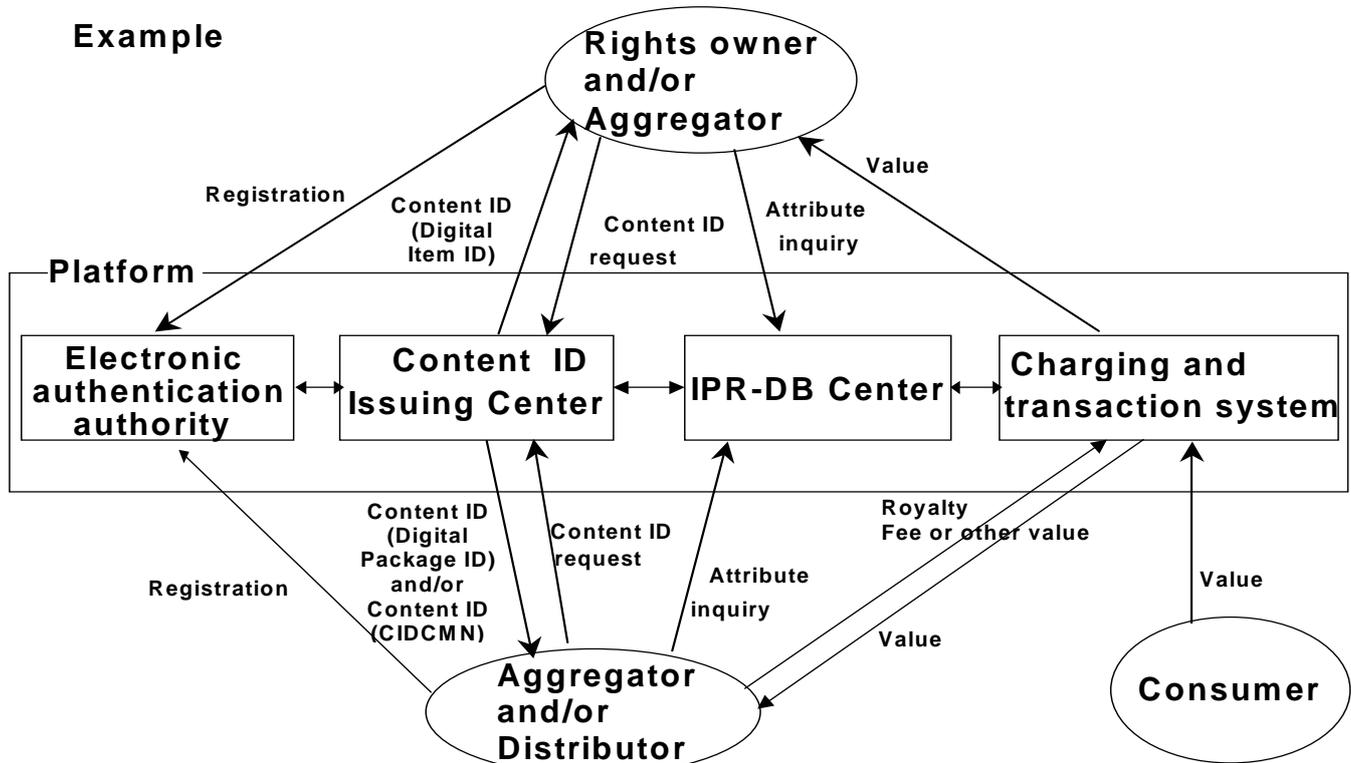


Figure 2.3.5 Services in the system layer

Each service in the system layer can be available to the players in other layers. The players in the system layer are the Electronic Authentication Authority (EAA), the Content ID Issuing Center (CIC), the IPR-DB Center (IPR-DB) and the Charging and Transaction System (CTS). However, it should be made clear that the EAA and the CIC will almost certainly be external players who have no direct relationship with cIDf. However, they are so integral to the process that they are included here.

5

The Rights Owner, the Aggregator and the Distributor register themselves with the EAA. Other players in the system layer authenticate the identities of Rights Owners, Aggregators or Distributors in each service with the cooperation of the EAA.

10

The CIC issues Content Ids in response to requests made by the Rights Owner or Aggregator. The metadata attributes that uniquely describe an item or package of digital content are kept in the IPR-DB and can be accessed by the Rights Owner and Aggregator as necessary.

The CTS charges either:

15

- some (usually monetary) value (fee) for the exploitation of packages of digital content by the Consumer or,
- a rights royalty or fee from the Aggregator(s) or Distributor(s)

In both cases the CTS passes the royalty or fee to the relevant Rights Owner(s). In the case of multiple Rights Owners, the IPR-DB can be referred to for rights ownership metadata, which identifies the royalty or fee each

Rights Owner should receive.

2.3.3 Case Studies

This section describes some processing flows and illustrates case studies based on the reference model developed in Section 2.3.2.

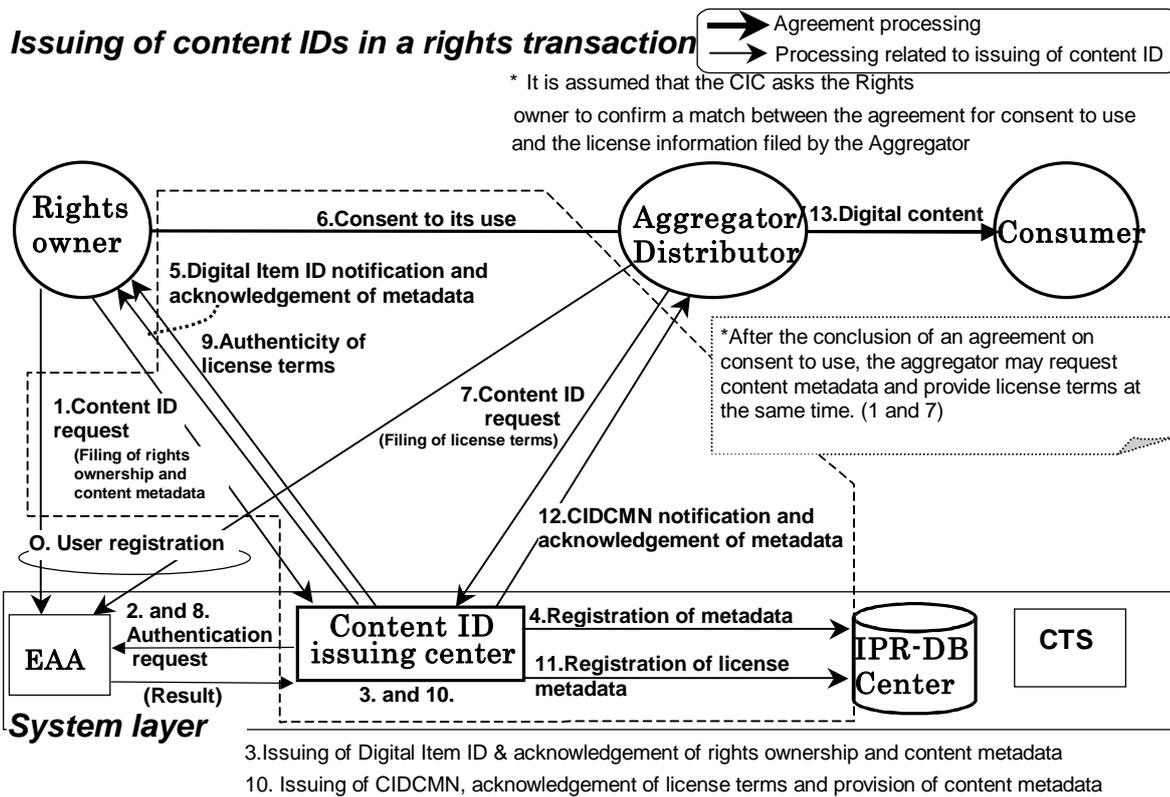


Figure 2.3.6 Processing flow example 1 (Content ID issuing in a rights transaction)

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Figure 2.3.6 shows the processing flow for the issuing of Content Ids during a rights transaction. The procedure is as follows.

0. The Rights Owner and the Aggregator/Distributor register with the EAA in advance.
- 10 1. The Rights Owner files metadata uniquely identifying his Work in the form of an item of digital content and the metadata describing the Rights ownership of it with the CIC and requests the issuing of a Content ID (Digital Item ID) for that item of digital content.
2. The CIC authenticates the Rights Owner.
3. The CIC issues a Content ID (Digital Item ID).
- 15 4. The CIC registers the item of digital content description and rights ownership metadata with the IPR-DB.
5. The CIC notifies the Rights Owner of the issued Content ID (Digital Item ID) and

acknowledges the item of digital content and rights ownership metadata.

6. The Rights Owner and the Aggregator/Distributor enter into a license agreement as to the exploitation of the item of digital content. This transaction may be carried out through a Rights Administrator.
 - 5 7. The Aggregator/Distributor files license terms metadata with the CIC, to request the issuing of a Content ID (CIDCMN) identifying the package of digital content containing the item of digital content, metadata which is the subject of the license agreement between the Rights Owner and the Aggregator/Distributor.
 8. The CIC authenticates the Aggregator/Distributor.
 - 10 9. The CIC checks with the Rights Owner whether the filed license terms metadata conforms to the agreement between the Rights Owner and the Aggregator/Distributor regarding the item of digital content.
 10. The CIC issues a Content ID (CIDCMN) to the Aggregator/Distributor.
 11. The CIC registers the license terms metadata with the IPR-DB.
 - 15 12. The CIC notifies the Aggregator/Distributor of the issued Content ID (CIDCMN), confirms the license terms and provides metadata describing the item of digital content.
 13. The Aggregator/Distributor enables exploitation of the package of digital content by the Consumer.
- 20 As referred to above, in this model the Rights Owner may be licensing a package of digital content, which itself contains one or more items of digital content, and then is added to other items or packages of digital content to create the new package of digital content that the Aggregator/Distributor is seeking to digitally distribute.

Content processing

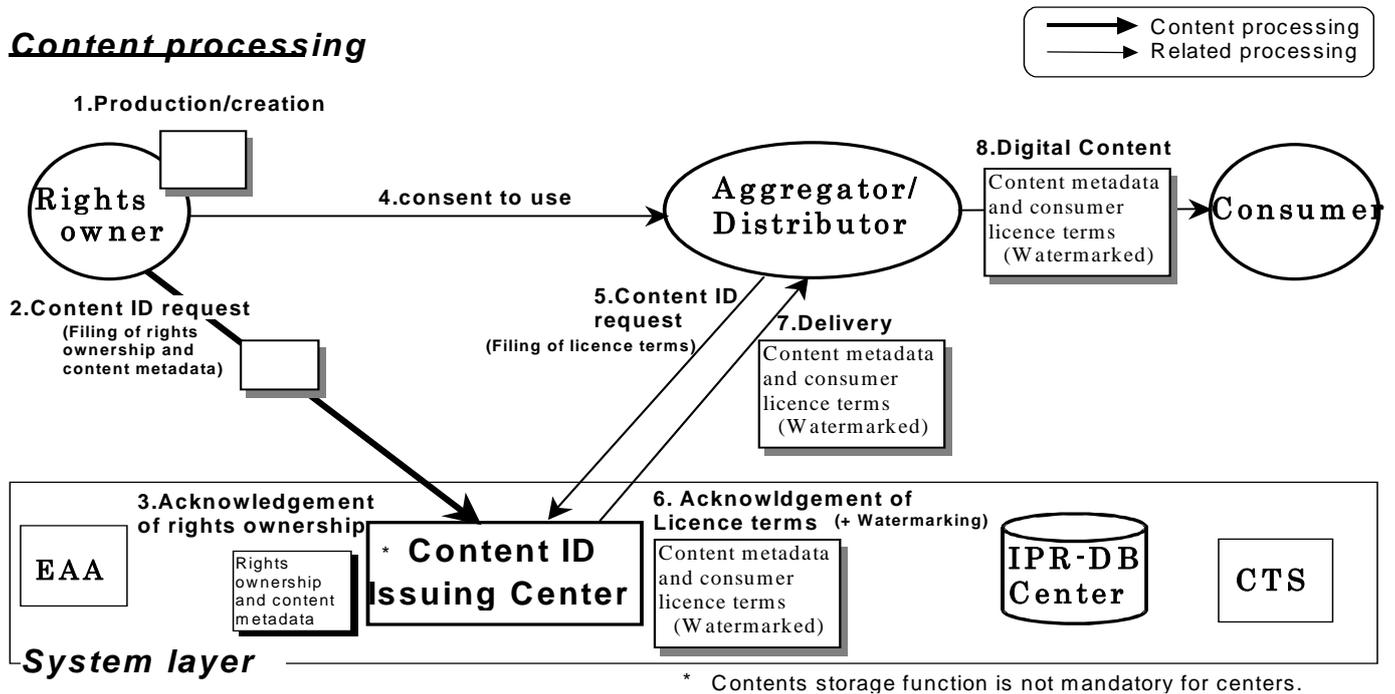


Figure 2.3.7 Processing flow example 1 (Content processing)

Figure 2.3.7 is the processing flow for the item(s) and package of digital content, which figure corresponds to the processing flow for the issuing of Content Ids illustrated in Figure 2.3.6. The procedure is as follows.

1. The Rights Owner produces a Work in the form of an item of digital content. (It should be noted that this model applies where the Rights Owner is creating a manifestation of a Work, such as a text publisher creating a book or a record producer a sound recording. In the case of some types of Works, such as musical works or the script of a film, they will not usually be converted into digital content. However, the principle remains the same when a musical work with its Content ID (Digital Item ID) is embodied by a sound producer (Aggregator) into a sound recording also with a Content ID (CIDCMN) or a film producer (Aggregator) embodies a script with its Content ID (Digital Item ID) in a feature film with a Content ID (CIDCMN).
2. The Rights Owner requests the CIC to issue a Content ID (Digital Item ID). (1 in Figure 2.3.6)
3. The CIC associates the rights ownership metadata with the item of digital content itself. (3 in Figure 2.3.6)
4. The Rights Owner and the Aggregator/Distributor enter into an agreement for the exploitation of the item of digital content in the form of a package of digital content. (6 in Figure 2.3.6)

5. The Aggregator/Distributor requests the CIC to issue a Content ID (CIDCMN). (7 in Figure 2.3.6)
 6. The CIC watermarks the package of digital content, and associates the watermark with the license terms metadata.¹ (10 in Figure 2.3.6)
 - 5 7. The CIC delivers the watermarked content to the Aggregator/Distributor. (12 in Figure 2.3.6)
 8. The Aggregator/Distributor enables the exploitation of the package of digital (watermarked) content by the Consumers. (13 in Figure 2.3.6)
- 10 Figure 2.3.8 shows the processing flow for the payment of royalties and fees (or other value transaction) that takes place after the delivery of the package of digital content to a Consumer as shown in Figure 2.3.7. In addition, the figure shows (A) an example of the current manual distribution of royalties and fees (or other value) by the Aggregator/Distributor, and (B) an example of proxy payment or other value distribution by the Charging and Transaction System.
- 15 Case A:
- A1. The Consumer pays (or passes some other value e.g. personal information) to the Aggregator/Distributor.
 - A2. The Aggregator/Distributor requests the rights ownership metadata from the IPR-DB Center. (Note: the IPR-DB may be located within the operations of a Rights Administrator acting as intermediary between the Rights Owner and the Aggregator/Distributor).
 - 20 A3. The Aggregator/Distributor distributes the royalties, fees or other value to the Rights Owner(s) in accordance with the retrieved rights ownership metadata.
- Case B:
- B1. The CTS collects payment or other value from the Consumer.
 - 25 B2. The CTS requests the license terms and rights ownership metadata from the IPR-DB Center (again this may be a Rights Administrator).

¹ It is assumed that the package of digital content is watermarked after the license terms are available.

B3. The CTS distributes the payment or other value to the Rights Owner(s), Aggregators or Distributors in accordance with the license terms and rights ownership metadata.

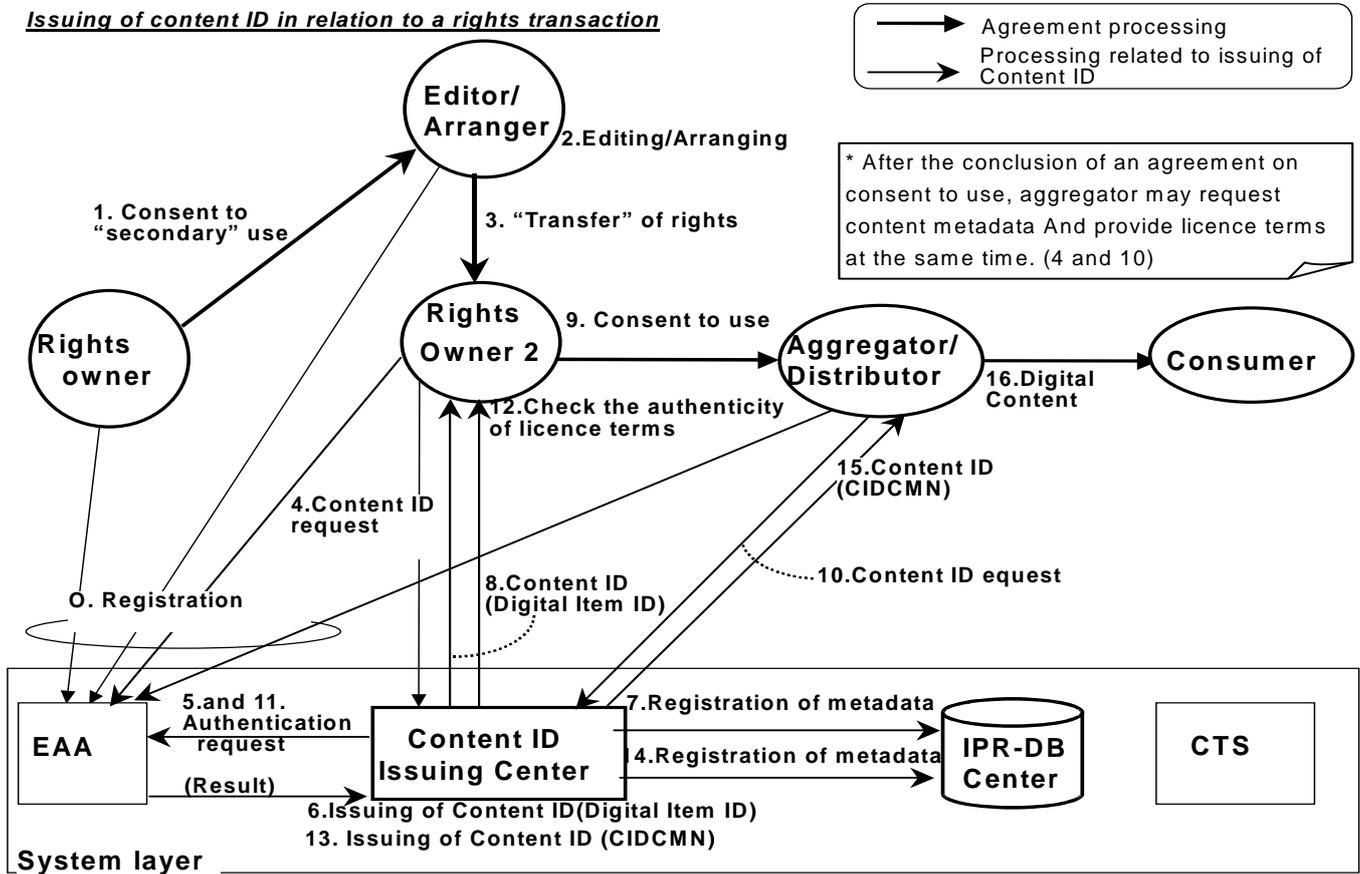


Figure 2.3.9 Processing flow example 2 (issuing of Content Ids in relation to a rights transactions)

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Figure 2.3.9 illustrates the processing flow for the issuing of Content ID in relation to a rights transaction involving the creation of a derivative work as an item of digital content for inclusion in a package of digital content. The procedure is as follows:

- 10 0. The Rights Owner, and the Editor/Arranger register themselves with the EAA in advance.
- 1. The Rights Owner issues the license for the original Work to be edited or arranged by the Editor/Arranger.
- 2. The Editor/Arranger creates a derivative Work as an item of digital content
- 3. The Editor/Arranger assigns or grants rights of administration in the derivative work to a Rights Owner (2), who may be different from the original Rights Owner
- 15 4. The Rights Owner (2) registers the item of digital content and rights ownership metadata with the CIC to request the issuing of a Content ID (Digital Item ID).

5. The CIC authenticates the Rights Owner.
6. The CIC issues a Content ID (Digital Item ID).
7. The CIC registers the item of digital content and rights ownership metadata with the IPR-DB.
- 5 8. The CIC notifies the Rights Owner (2) of the issued Content ID (Digital Item ID) and acknowledges the associated item of digital content and rights ownership metadata.
9. The Rights Owner and the Aggregator/Distributor enter into an agreement for the use of the item of digital content.
10. The Aggregator/Distributor registers license terms with the CIC to request the issuing of a Content ID (CIDCMN) in respect of the package of digital content which includes the item of digital content (Content ID (Digital Item ID)).
- 10 11. The CIC authenticates the Aggregator/Distributor.
12. The CIC checks with the Rights Owner whether the registered license terms conform to the license granted to exploit the item of digital content within the proposed package of digital content.
- 15 13. The CIC issues a Content ID (CIDCMN) to the Aggregator/Distributor, identifying the package of digital content.
14. The CIC registers the license terms with the IPR-DB.
15. The CIC notifies the Aggregator/Distributor of the issued Content ID (CIDCMN) and associated package of digital content metadata and acknowledges the license terms.
- 20 16. The Aggregator/Distributor enables the exploitation of the package of digital content by Consumer.

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Content processing

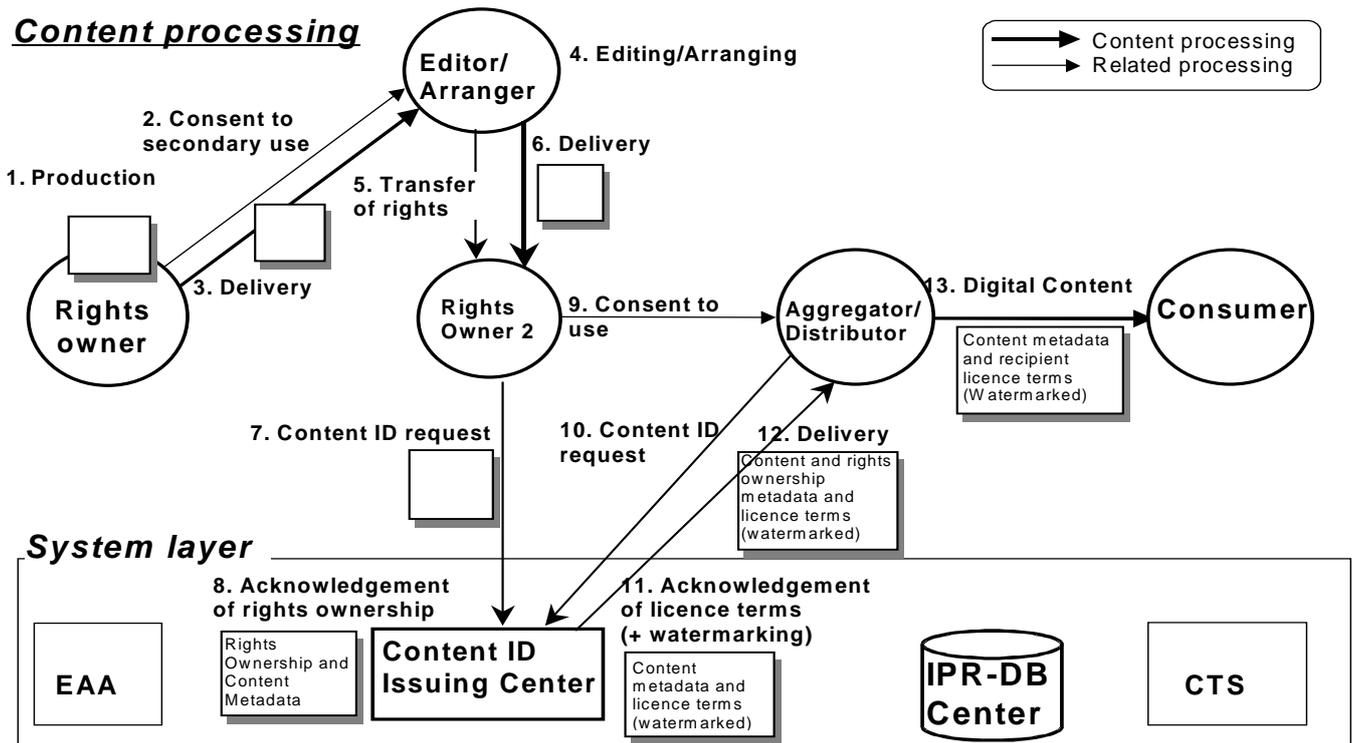


Figure 2.3.10 Processing flow example 2 (content processing)

Figure 2.3.10 shows the processing flow for the item and package of digital content corresponding to the processing flow shown in Figure 2.3.9. The procedure is shown below.

- 5 1. The Rights Owner produces a Work in the form of an item of digital content.
2. The Rights Owner grants a license for the editing or arrangement of the item of digital content by the Editor/Arranger (1 in Figure 2.3.9)
3. The Rights Owner delivers the item of digital content to the Editor/Arranger.
4. The Editor/Arranger creates a derivative Work in the form of an item of digital content. (2 in Figure 2.3.9)
- 10 5. The Editor/Arranger assigns or grants rights of administration in the derivative Work in the form of an item of digital content to a Rights Owner (2), who may be different from the original Rights Owner. (3 in Figure 2.3.9)
6. The Editor/Arranger delivers the item of digital content to the Rights Owner (2).
- 15 7. The Rights Owner (2) requests the CIC to issue a Content ID (Digital Item ID). (4 in Figure 2.3.9)
8. The CIC associates the item of digital content and rights ownership metadata with the item of digital content itself. (6 in Figure 2.3.9)

9. The Rights Owner (2) and the Aggregator/Distributor enter into an agreement for the exploitation of the item of digital content within a package of digital content. (9 in Figure 2.3.9)
10. The Aggregator/Distributor requests the CIC to issue a Content ID (CIDCMN) in respect of the package of digital content containing the item of digital content. (10 in Figure 2.3.9)
11. The CIC watermarks the package of digital content and associates it with the license terms metadata.² (13 in Figure 2.3.9)
12. The CIC delivers the (watermarked) package of digital content to the Aggregator/Distributor. (15 in Figure 2.3.9)
13. The Aggregator/Distributor enables the exploitation of the package of digital (watermarked) content by Consumer. (16 in Figure 2.3.9)

² The package of digital content is watermarked after the license terms are available.

Transaction (payment) processing

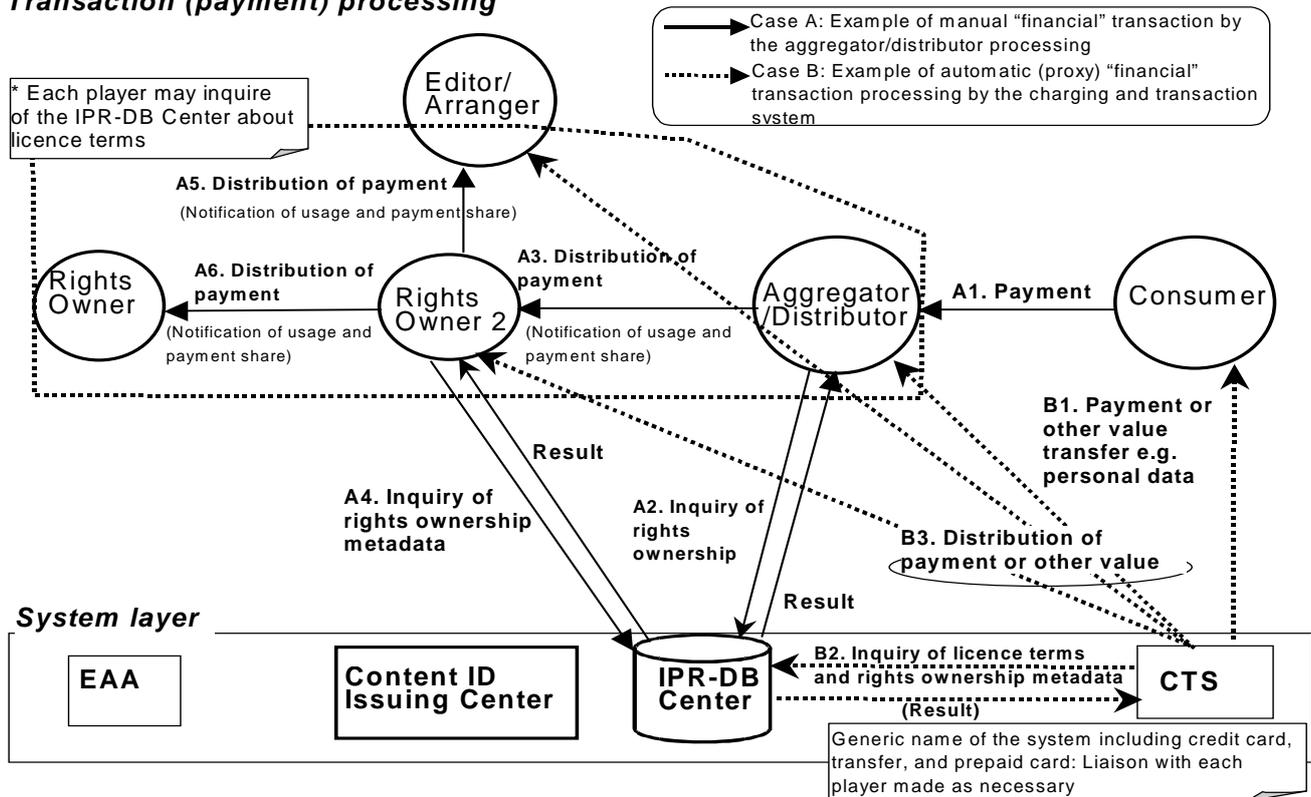


Figure 2.3.11 Processing flow for the management of payment or other value and its distribution

Figure 2.3.11 shows a processing flow for the payment, royalty or fee transaction that take place after the exploitation transaction shown in Figure 2.3.10. In addition, the figure shows (A) an example of manual distribution of payments, royalties or fees by the Aggregator/Distributor, and (B) an example of proxy distribution of payments royalties or fees by the CTS.

Case A:

- A1. The Consumer pays (or passes some other value) to the Aggregator/Distributor.
- A2. The Aggregator/Distributor requests the rights ownership metadata from the IPR-DB Center.
- A3. The Aggregator/Distributor distributes the payment or other value to the Rights Owner (2) in accordance with the retrieved rights ownership metadata.
- A4. The Rights Owner (2) requests the rights ownership metadata of the Rights Owner from the IPR-DB
- A5. The Rights Owner (2) distributes the appropriate share of the payment, royalty, fee or other value to the Editor/Arranger.
- A6. The Rights Owner (2) distributes the appropriate share of the payment or other value to the (original) Rights Owner.

Case B:

- 5
- B1. The CTS collects payment or other value from the Consumer.
 - B2. The CTS requests the rights ownership metadata and license terms (regarding payment share) from the IPR-DB Center.
 - B3. The CTS distributes appropriate shares of the payment to the Aggregator/Distributor, the Rights Owner (2), the Editor/Arranger and the (original) Rights Owner in accordance with the rights and license terms metadata.

2.3.4 *Security of Digital Content*

2.3.4.1 *Levels of technical security*

10 In distributing and exploiting packages of digital content over networks, it is possible to protect against the unauthorized use of them by applying different levels of technical security, which can be defined as follows:

Level 0: No precautions

15 No technical measures are taken to protect the content other than the education of Consumers about the intellectual property rights and the enforcement of rights through the law

Level 1: Passive Security

20 The package of digital content is embedded with the Content ID (CIDMCN) through the use of watermarking technology (see Chapter 3.5)³. Digital content metadata and the license terms and conditions metadata (called the Distributed Content Descriptor (DCD) are associated with the Content ID (CIDCMN) and this the package of digital content (see Chapter 3.4). Illegal usage is regularly tracked and monitored (see Chapter 3.8) Part of the metadata associated with a Content ID (CIDCMN) is inserted in the file header of the package of digital content itself.

Level 2: Active Security

25 The package of digital content is embedded with the Content ID (CIDCMN) through the use of watermarking technology (see Chapter 3.5). Part of the metadata associated with a Content ID (CIDCMN) is inserted in the file header of the package of digital content itself (see Chapter 3.4). Digital Rights Management (DRM) technology is used to enforce secure distribution of packages of digital content. Usage rules to manage packages of digital content are employed within DRM systems.

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³ Watermarking is possible in some cases, such as static pictures, moving pictures, music, etc, but is not (as yet) possible in other cases, such as plain text.

2.3.4.2 *Assumptions on the security environment*

Functional requirements for security measures have developed on the assumption that Levels 1 or 2 will be a requirement of all Rights Owners.

- 5 The scope of this activity by the Technical Working Group includes the definition of the Content ID identifiers, their associated metadata and the Distributed Content Descriptor (DCD), which cIDf believes are necessary to fulfill the requirements set out in Levels 1 and 2 above, and to meet the general functional requirements of the different players and the various processes set out above.
- 10 The Content ID metadata must include attributes that describe the method of usage restriction to be implemented with respect to the items and packages of digital content.

2.4 Functional requirements

2.4.1 *Rights Owner Requirements*

15 **Registration of ownership of Rights in Works in the form of items of digital content**

- The Rights Owner needs to be able to register rights in items of digital content with a publicly-recognized agency.
 - The Rights Owner needs to be able to create a persistent association between the item of digital content and the metadata that establishes a claim of ownership in the item of digital content, including when it is used to make up part of a package of digital content. This will help prevent the item of digital content being exploited without the Rights Owner's consent.
 - Where an item of digital content is edited or arranged by an Editor/Arranger, a mechanism is required to show that the derivative Work (in the form of an item of digital content) was derived from the Work of the (original) Rights Owner.
 - The Editor/Arranger needs to be able to access information establishing the Rights Owner of an item of digital content.
 - Minimum attributes describing the item of digital content need to be made publicly available, whilst it must be possible for metadata considered to be private to remain undisclosed.
 - If the Rights Owner modifies the registered item of digital content, it must be possible to re-register metadata which clearly identifies the modified version of the item of digital content.
- 20
- 25
- 30

Flexibility and observance of usage conditions

- The Rights Owner needs to be enabled freely to set *and to change* usage conditions (sales price or sales period, usage period or number of times that it may be used, etc) relating to the items of digital content.
- Once the item of digital content in the form of a package of digital content has been sent to the Consumer,

it should only be used in accordance with preset usage conditions.

- If a Work is edited or arranged by an Editor/Arranger, it must be done within the limits of the license granted by the (original) Rights Owner.
- It must be possible to describe and record the editing or arranging history of an item of digital content.
- Where the Rights Owner licenses exploitation of items of digital content to an Aggregator/Distributor, the Rights Owner needs to be able to check that the Aggregator/Distributor is exploiting the item of digital content (in the form of a package of digital content) within the limits defined in the terms of the license.
- Where authorized by the Rights Owner, it must be possible to permit distribution and exploitation of items of digital content in the form of packages of digital content for any use including, for example, activities for promotional purposes.

Fast and transparent financial processing system

- It must be possible to track the usage of the item of digital content, to count correctly how many times it has been used.
- Financial processing needs to be undertaken without delay
- Where the Rights Owner licenses an Aggregator/Distributor to exploit the item of digital content in the form of a package of digital content, there needs to be a mechanism whereby the Rights Owner's agreed share of any payments, royalties or fees generated from the exploitation of the package of digital content containing the item of digital content is distributed directly to the Rights Owner's account.

Digital content types

- Rights Owners need to be able to register metadata identifying a wide variety of different items of digital content types including text data, audio data, video data, CAD data, and software.

2.4.2 Editor/Arranger Requirements

Since an Editor/Arranger may have interests as a Rights Owner in their own right, the requirements that overlap with Rights Owners are omitted from the following.

Speedy acquisition of digital content attribute information.

- When the Editor/Arranger wishes to edit or arrange an existing item of digital content, he needs to be able promptly and easily to access metadata about the rights ownership of the item of digital content.
- In the event that any significant attribute of the original item of digital content used by the Editor/Arranger changes, he needs to be able promptly to acquire the relevant modified metadata.

Efficient rights licensing

- The Editor/Arranger needs to be able to obtain an appropriate license to edit or arrange from the Rights Owner of the item of digital content he wishes to use, through automated systems.

2.4.3 Aggregator/Distributor requirements

The CIC may sometimes act as an Aggregator/Distributor.

Unconstrained development of business models

- Aggregators/Distributors need to define a diversity of business models in order to create as much differentiation in their Consumer offerings as possible to create market advantage.
- Aggregator/Distributors need to be able to determine the value (whether monetary or otherwise) charged for their offerings in a timely and flexible manner.
- Aggregators/Distributors need to be able to obtain in a timely and flexible manner usage information relating to the exploitation of the package of digital content they are offering to Consumers. This information is required for a range of purposes including reporting to Rights Owners and for marketing evaluation.

Acquisition of Consumer information

- During the process of providing packages of digital content to Consumers, Aggregators/Distributors need to be able to identify the Consumer as trustworthy in order that other Aggregator/Distributors are reassured in offering the Consumer digital content. *
- This issue clearly has privacy and personal data implications and is continuing to be studied on the basis that this information must only be available with the agreement of the Consumer.

2.4.4 Consumer Requirements

Anonymity

- Consumers need to be assured that information about what packages of digital content they have bought or exploited should not be known to anyone else.

Privacy protection

- Personally identifiable information should not be collected by anyone without the explicit consent of the Consumer themselves.

Search and Retrieval

- The Consumer needs to be able to obtain attribute information on a complete range of packages of digital content from a single source, rather than requiring searching for individual packages of digital content from a range of different search sources.

3. The Technology to implement the practical use of ContentID

3.1 Introduction

This chapter describes the technical requirements that must meet implementation of ContentID framework.

3.2 Goals

5 The goals are to identify standard technologies to implement the functions for a digital content distribution mapped in the cIDf reference model. In particular, issues relating to the protection of copyright and privacy, and search convenience have high-priority. These are also studied. :

- 10 (i) The functions that enable the various players identified in the reference model to obtain digital content metadata attributes by various means, for example, through metadata being carried in digital content file headers, or by accessing databases containing the relevant metadata.
- (ii) The functions that protect digital content by enabling, for example, the detection of any changes to and/or removal of metadata from the file header or the detection of any form of illegal exploitation of the package of digital content.

15

3.3 Overview of processing to issue ContentID

3.3.1 Relationship between digital content and Content Ids

20 This diagram illustrates how a package of digital content may be defined and described by the various sets of metadata attributes made available through the cIDf Specification process. The hierarchy of these different sets of metadata attributes is as follows:

Metadata in the “IPR database” describing the package of digital content,
including the Content ID (CIDCMN)



25 The Distributed Content Descriptor (DCD) describing the digital content and distribution attributes relating to an item or package of digital content



The Content ID (the CIDCMN issued by the CIC and embedded
in the package of digital content)

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The metadata in the IPR-DB relating to the relevant package of digital content includes, among others elements, the attribute information, which also includes the Content ID described in Chapter 2, described in Chapter 4.

Various players in the digital content distribution chain may interrogate the IPR-DB and access different items of metadata depending on the authority levels granted to them.

5 The Distributed Content Descriptor (DCD) is a subset of metadata within the IPR database; it is expressed in the form of an XML Document, and is distributed with the package of digital content itself.

10 The Content ID (CIDCMN) is a unique number assigned to each package of digital content by the CIC before distribution takes place. The CIDCMN may be embedded in the package of digital content itself, using digital watermarking techniques. Watermarking of the package of digital content with the CIDCMN is an option within the specification and can occur at the same time that the CIDCMN is added to the DCD and the IPR database.

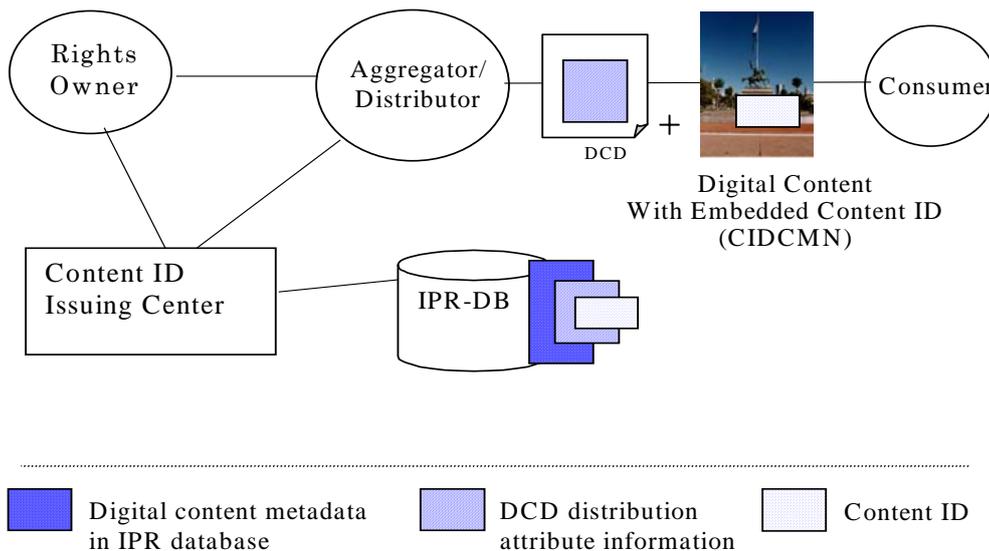


Fig. 3.3.1 Hierarchy model of metadata attributes

3.3.2 Outline of content processing flow

An example of the Content ID issuing process is illustrated in Figure 3.3.2. The Content ID (Digital Item ID) is a temporary identifier assigned to items of digital content. The syntax of this number is not specified. The Content ID (CIDCMN) is the unique identifier assigned to a package of digital content to enable all copyright and digital management operations within the cIDf Specification. This is the identifier that is carried in the DCD associated with a package of digital content or the watermark of a package of digital content where this has been added.

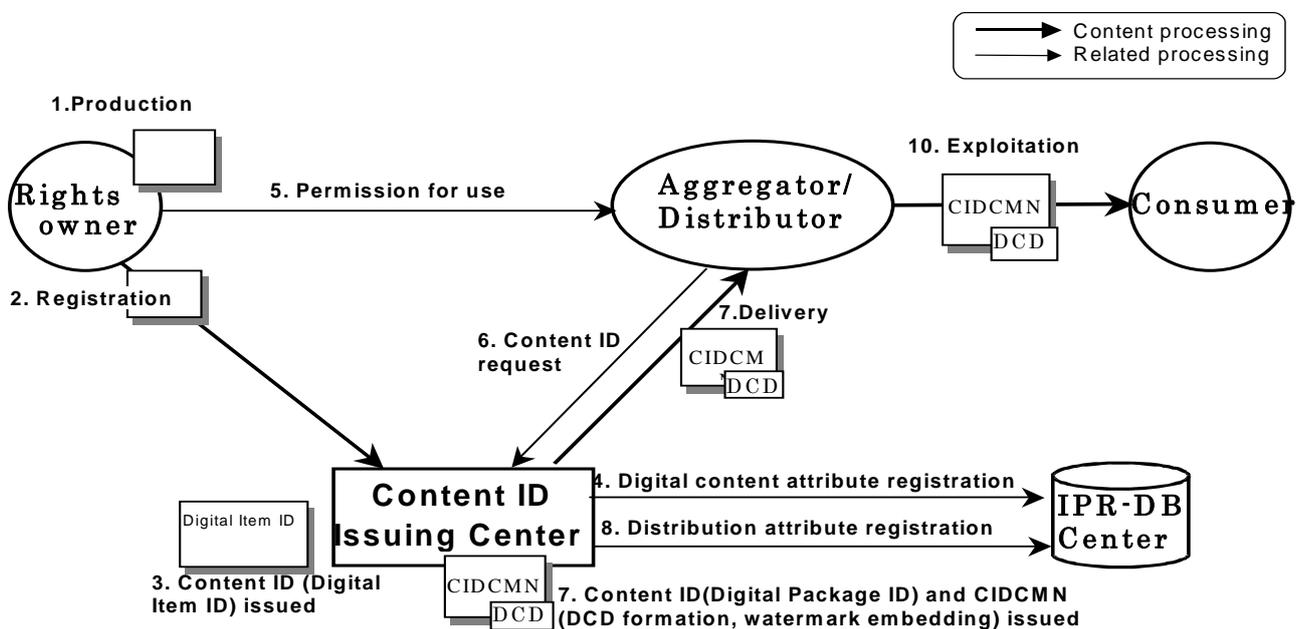


Figure 3.3.2 Example of Content ID Processing

1. The Rights Owner produces an item of digital content.
2. The Rights Owner sends the item of digital content and its associated metadata to the CIC, and enters a registration request.
3. The CIC issues a Content ID (Digital Item ID) identifying the item of digital content received from the Rights Owner. The Digital Item ID only needs to be unique within a single CIC. It does not need to be globally unique. However, if a CIC wished to make it globally unique, the syntax would be as follows: Version Number, Type Number, Group Number, CIC Number, and the CIC Internal Management Number which might be made up of the Digital Item ID, thus mirroring the syntax for the CIDCMN (see below).
4. The CIC registers the Content ID (Digital Item ID) and its associated metadata with the IPR database (preliminary registration).

5. The Rights Owner grants a license to exploit the item of digital content as part of a package of digital content to an Aggregator/Distributor.
6. The Aggregator/Distributor sends the relevant distribution attribute metadata to the CIC and enters a request for a Content ID (CIDCMN) which uniquely identifies the package of digital content for distribution and exploitation.
7. Based on the request from the Aggregator/Distributor, the CIC issues a Content ID (CIDCMN) identifying the package digital content containing the item(s) of digital content each of which has already been assigned a Content ID (Digital Item ID). The CIDCMN is a concatenation of the Version Number, the Type Number, the Group Number, the CIC Number and the CIC Internal Management Number⁴. The CIC also creates a DCD from a combination of the package of digital content metadata and its associated distribution attribute metadata. As an option, the CIDCMN can be embedded in the package of digital content using digital watermarking technology.
8. The CIC registers the Content ID (CIDCMN) and the distribution attribute metadata in the IPR database. (At this point, the Content ID (Digital Item Ids) + Content ID (CIDCMN) + digital content metadata + and the distribution attribute metadata is registered as a group in the IPR-DB.)
9. The CIC sends the DCD and the package of digital content (identified with the Content ID (CIDCMN) issued) to the Aggregator/Distributor. The DCD and the package of digital content together are a Digital Distribution Content Pair
10. The Aggregator/Distributor creates a package comprising the DCD and the digital content (identified with its Content ID (CIDCMN)), and offers this package of digital content to the Consumer.

3.4 Distributed Content Descriptor

It is intended that the Distributed Content Descriptor (DCD) should be distributed with the package of digital content itself. Below is the definition of the metadata attributes that make up the DCD.

3.4.1 DCD Attributes

The attributes that appear in the DCD include the Content ID (CIDCMN) and a subset of the digital content metadata. The DCD should be associated with the package of digital content using the method most appropriate to the media types of the items of digital content contained within the package of digital content. Among the attributes that appear within the DCD is the method used for watermarking the package of digital content (where this has been done). Figure 3.4.1 shows the configuration of the attributes contained within the DCD.

⁴ No syntax is specified for this latter item, but it might contain Digital Item IDs

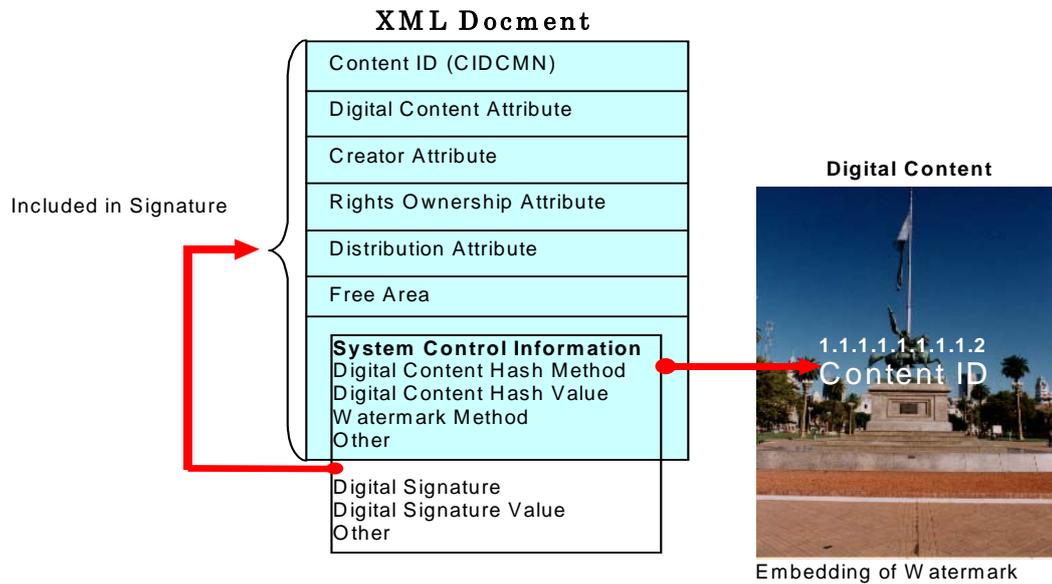


Figure 3.4.1 Configuration of Attributes in DCD

3.4.2 Explanation of terms used

	Term	Abbreviation	Explanation
1	Distributed Content Descriptor	DCD	This is explained in detail in this chapter
2	Embedded Model	-	A mechanism for attaching the DCD to the digital content by embedding it in the package of digital content file
3	Separate Model	-	A mechanism for associating the DCD to the package of digital content by storing it in a file separate from (but associated with) the package of digital content.
4	DCD Embedded Format	DCD-EF	Common DCD format used in the Embedded Model.

3.4.3 *Functions of DCD*

The functions of the DCD are as follows:

- (i) To enable local referencing of a minimum set of metadata describing the package of digital content and the relevant distribution attributes, to facilitate identification of the package of digital content without having to request detailed metadata from the IPR-DB each time.
- (ii) To enable easy detection of alterations in the package of digital content or in the DCD itself.
- (iii) To provide a dramatic expansion in the scope of applications through the use of a “free area” that permits the Aggregator/Distributor to input information after the DCD has been issued thus enabling the development of creative business opportunities.

3.4.4 *Alternative Models for associating the DCD to content*

Fig. 3.4.2 illustrates alternative models for associating the DCD with the package of digital content it describes. In the Embedded Model the DCD is embedded in the package of digital content header or within a bit stream, where it will not affect exploitation of the digital content by the Consumer, according to the coding rules for the designated media in which the package of digital content is stored. In the Separate Model the DCD is contained in a file that is separate from but associated with the package of digital content to which it relates. Table 3.4.1 examines the pros and cons of these alternative models for associating the DCD with the package of digital content it describes.

Table 3.4.1: Pros and Cons of Alternative DCD Models

Model	Embedded Model	Separate Model
Advantages	The DCD is an integral part of the package of digital content and so it is difficult to separate or alter	Allows the association of large amounts of information with packages of digital content and is not constrained by the file type in which the package of digital content is rendered. Enables interpretation and management of the DCD with an XML parser and other general-purpose tools.
Disadvantages	Limits the volume of metadata that can be carried. (Particularly in the case of moving images, Real-time playback of the package of digital content can be affected.) Specialized software is required for writing and referencing the metadata. In certain file types, there may be no area available for storing the metadata.	Can be easily dis-associated from the package of digital content giving rise to a high risk that metadata can be altered or lost.



(1) Embedding Model

(2) Separate Model

Fig. 3.4.2 Alternative Models for associating the DCD with packages of digital content

3.4.5 Metadata reference model

- 5 Figures 3.4.3(a), (b), and (c) illustrate the procedures for a Consumer to obtain all attributes of the metadata from the IPR-DB for each of the three metadata management methods that may be adopted within the cIDf Specification: the Embedding Model, the Separate Model, and by inserting the CIDCMN in the package of digital content using a watermark.

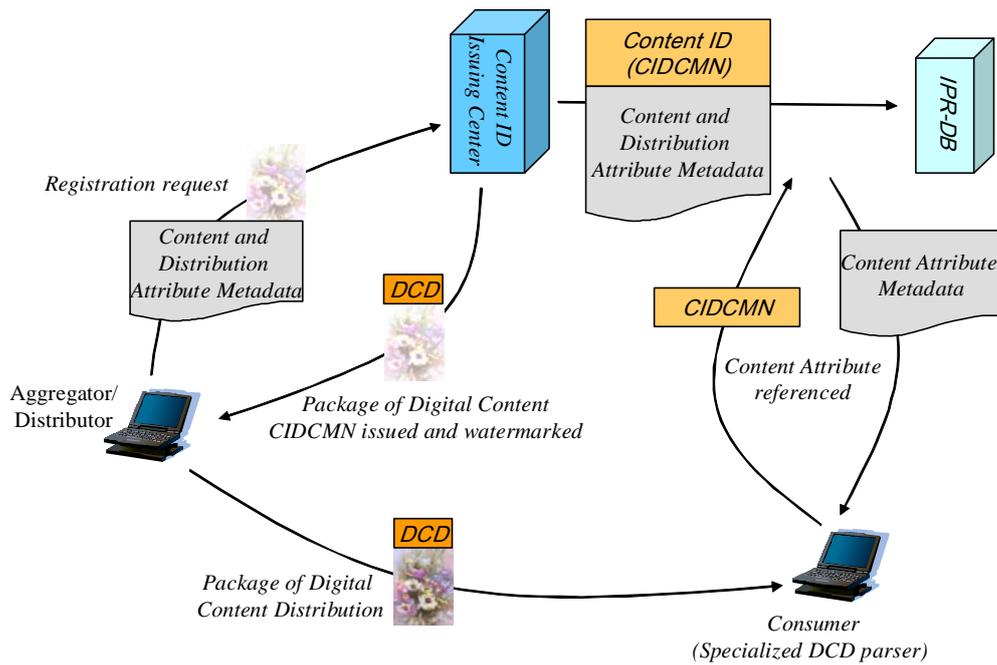


Fig. 3.4.3(a): Metadata reference procedure (for Embedded Model)

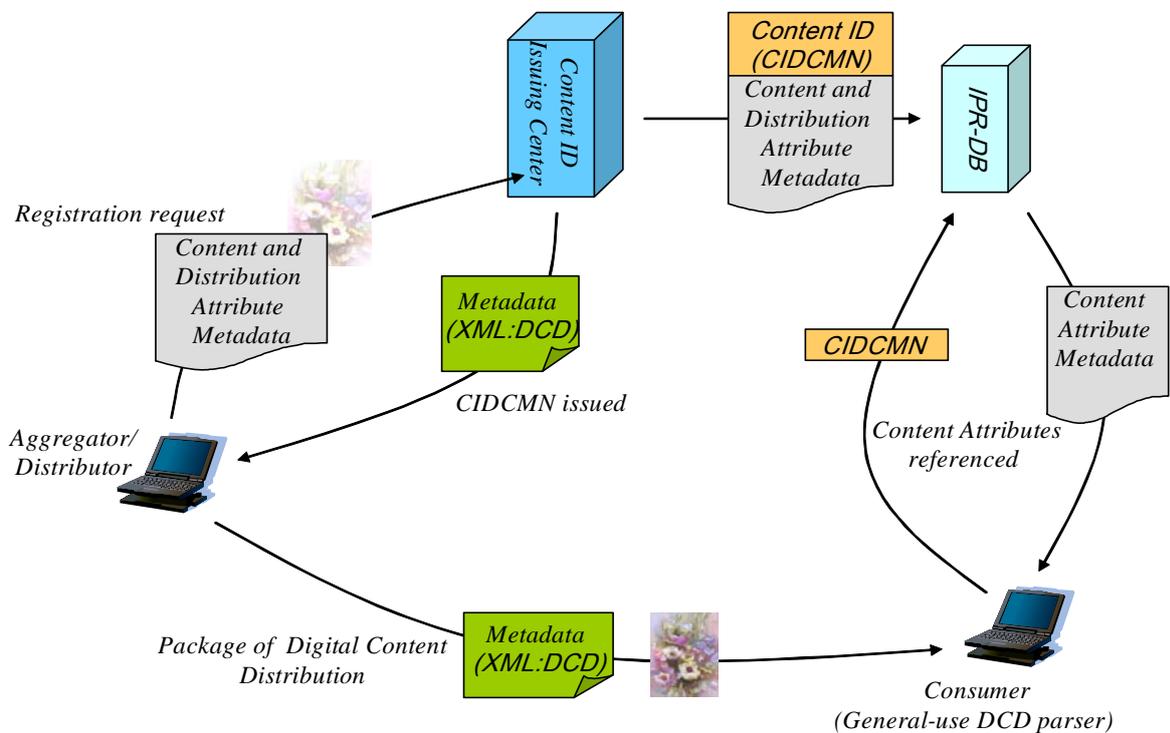


Fig. 3.4.3(b): Metadata reference procedure (for Separate Model)

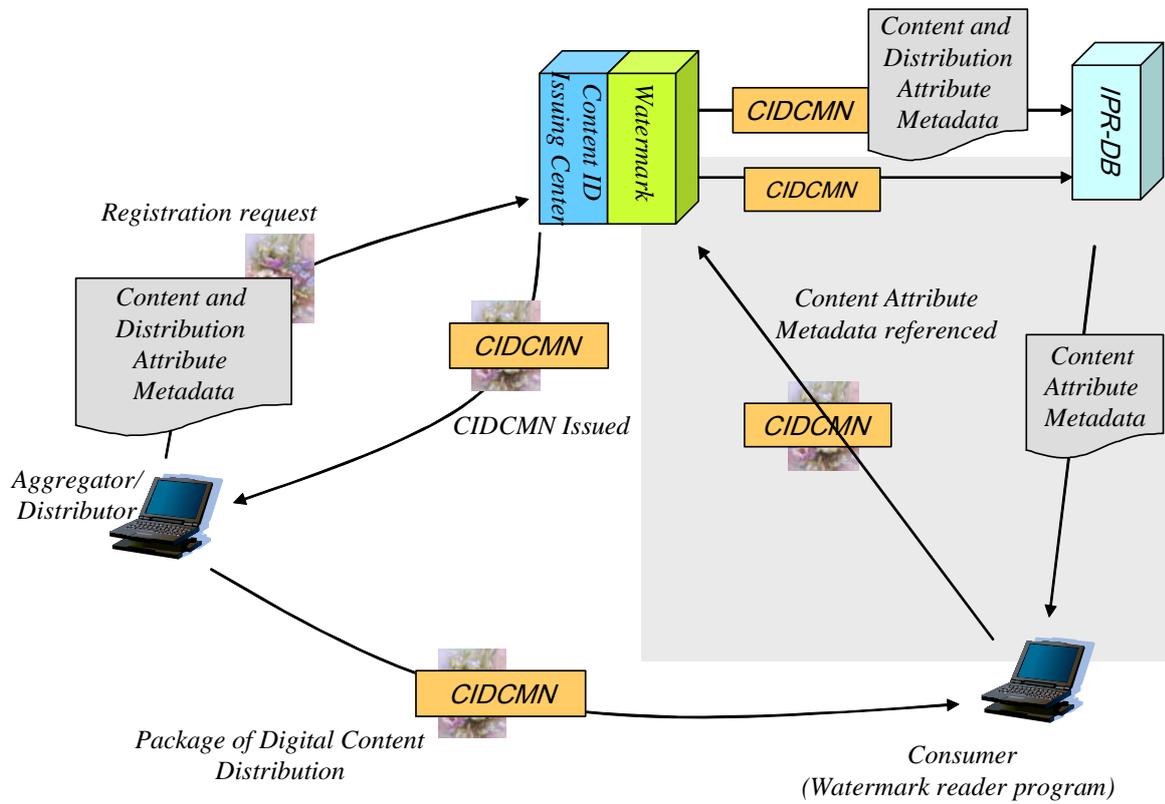


Fig. 3.4.3(c): Metadata reference procedure (for Watermarking Model (Option))⁵

⁵ Resolution has been omitted and in Fig. 3.4.3(c), when the Consumer has the appropriate watermark reader program, they do not need to access the Watermark Center)

3.4.6 *DCD functions*

The following functions have been defined for the DCD:

- (i) Carrying the unique identifier (Content ID (CIDCMN)) which is essential as the IPR-DB reference key
- 5 (ii) Enabling Content ID (CIDCMN) authentication through the XML signature
- (iii) Identifying evidence of tampering (alteration or amendment) with the package of digital content by means of the package of digital content hash value which is contained within the XML signature
- 10 (iv) Identifying evidence of tampering (alteration or amendment) with the metadata (digital content attributes, rights ownership attributes, distribution attributes) by means of the XML signature
- (v) Identifying evidence of removal and/or replacement of the metadata (digital content attributes, rights ownership attributes, distribution attributes) by means of the package of digital content hash value which is contained within the XML signature Carrying a
15 segment of internal information from the IPR-DB.
- (vii) Carrying a segment of the metadata from the IPR-DB (digital content attributes, rights attributes, distribution attributes etc.)

3.4.7 *DCD expression models*

3.4.7.1 *Embedded model*

20 **(1) DCD Embedded Model Format**

The Embedded Model Format (DCD-EF) is defined as containing, a DCD Main Body Type Indicator (see Table 3.4.3) + a sequence number + the size of the DCD in bytes + the DCD itself. Table 3.4.2 shows the specification for the Embedded Model Format.

Table 3.4.2: Syntax of DCD Embedded Model Format (DCD-EF)

Item	Explanation	Length (bytes)	Possible Values
DCD Main Body Type Indicator	Indicates which “form” (see Table 3.4.3) of DCD is embedded “CID” + “1 to 3”	4	0x43 49 44 + format 1 byte (01 or 02 or 03)
Sequence number	When the DCD data has been split up, this indicates which part of the DCD is in the sequence	1	01 to FE
DCD Size	Size of DCD (in bytes)	2	00 01 to 3FFF
DCD	Main body of DCD	2 or more	-

(2) DCD Main Body Type Indicator

The DCD Main Body Type Indicator number follows “CID” in this field. The indicator values are defined in Table 3.4.3.

Table 3.4.3: DCD Main Body Types

Type	Name	Explanation	Length (bytes)	Notes
1	Mini DCD	Only the Mini DCD Model (see below) appears in the DCD field	2 or more	This is the smallest configuration of the Embedded Model
2	DCD Text	This is the first of the Normal DCD Types which uses a textual XML form in the DCD field (see below)	<i>97 or more</i>	Please refer to separate notes on DCD Model textual XML form and metadata schema
3	DCD Binary	This is the second of the Normal DCD Types which uses an XML binary format in the DCD field (see note)	-	This issue is the subject of further study

(3) Sequence number

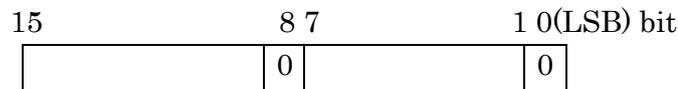
Table 3.4.4 gives a detailed breakdown of the “Sequence number.” (1 byte) in Table 3.4.2 .

Table 3.4.4: Configuration of DCD Embedded Model Format Sequence Number.

Bit	Explanation	Meaning
1 st bit	When the DCD data has been split up, the flag indicates whether this is the last piece of data	0: Not DCD END 1: DCD END
2 nd to 8 th bit	When the DCD data has been split up this indicates which point of the DCD this is in the sequence	Permitted values: 1 to 126 ⁶

5 **(4) DCD Size**

The “DCD Size”, as referred to in Table 3.4.2, of the DCD is stipulated in 2 bytes. The size of the DCD itself is limited to 64KB – 7B (because 7 bytes is the length of the data giving the DCD Main Body Type Indicator + a sequence number. + the size of the DCD). In terms of the 2 byte “DCD Size”, because of a problem with the reserved word for the various media, the first byte (1 to FE) and second byte (1 to FE) must be stipulated, and FF must be avoided even in the juncture between the first and second bytes. As a method of avoiding FF, the LSB for the 2-byte “DCD Size” area is designated “unused” (0), and the limit for the previous 7 bits is set as 1 to 3FFF (see Fig. 3.4.4).



15 Fig. 3.4.4: Size area expression

(5) Main body of DCD

There are two types of DCD:

- The Mini DCD Model which comprises only the unique code (CIDCMN)
- 20 □ The DCD-text Model is used when text is inserted and then requires the use of the Separate Model. Section 3.4.7.3 describes the Separate Model’s specification and gives details of the syntax of the text in the internal DCD form information.

3.4.7.2 DCD binding method

25 The expression code system and the insertion positions in the media for the various DCD formats used in the Embedded Model are described in this section.

⁶ 00(h) and FF(h) are reserved values

(1) Image media (JPEG)

- *Insertion method*

Add a comment marker to the end of the file and insert the DCD.

- *Expression code*

5 The unique code inserted as the DCD is standardized as a hexadecimal expression ASCII character string model.

- *Insertion position*

Figure 3.4.5 shows the DCD insertion location in the case of image media (JPEG).

SOI	Image data	User comment			EOI
		COM	Size	DCD-EF	

10

Legend

Item	Explanation	Length (bytes)	Code value
SOI	“Start of Image” marker	2	0xFFD8
Image data	Image data	-	-
COM	Marker Code	2	0xFFFE
Size	Segment length (Length of DCD-EF)	2	-
DCD-EF	Shown in Table 3.4.2	-	-
EOI	“End of Image” marker	2	0xFFD9

Fig. 3.4.5 DCD Insertion Location in Image (JPEG) Media

(2) Video media (MPEG1)

- *Insertion method*

15 Insert the DCD in one of the two UD (User Data) areas that can be freely set by the user (Sequence Layer or GOP Layer), out of the six layers in the MPEG1 Video configuration (Sequence Layer, GOP Layer, Picture Layer, Slice Layer, Microblock Layer, and Block Layer).

- *Expression code*

If the DCD is the same as the data recognition start code (0x000001) an error will result; thus, the unique code inserted as the DCD is expressed as a hexadecimal, and converted into ASCII for insertion.

20

- *Insertion position*

(2-1) MPEG1 System Region

The DCD is inserted at the top of the file as a PES packet.

Figure 3.4.6 shows the DCD insertion position in the video media (MPEG System) PES packet.

25

Start code	Stream ID	Length	Packet Data
			DCD-EF

Legend

Item	Explanation	Length (bytes)	Code value
Start code	PES packet start code	3	0x00 00 01 fixed
Stream ID	Element stream type	1	0xBF
Data length	Length of DCD-EF	2	-
Packet Data	Shown in Table 3.4.2	-	-

Fig. 3.4.6 DCD Insertion Location in Image (MPEG1 System) Media

(2-2) MPEG1 Video Region

- 5 Add User Data to the end of the sequence header and the GOP header, and insert the DCD. Figure 3.4.7 shows the DCD insertion location in the case of video media (MPEG1 Video).

Sequence layer			GOP layer				Lower layer	End
SHC	Image configuration Information	User Data	GSC	GOP inf.	UD (User Data)		Image data	SEC
		UDSC			UD (DCD-EF)	UDSC		

Legend

Item	Explanation	Length (bytes)	Code value
SHC	Sequence layer start code	4	0x00 00 01 B3
Image config inf.	Shows image configuration	-	-
UDSC	User Data start code	4	0x00 00 01 B2
UD (DCD-EF)	Shown in Table 3.4.2	-	-
GSC	GOP start code	4	0x00 00 01 B8
GOP information	Shows GOP configuration	-	-
Image data	Image data	-	-
SEC	Sequence layer end code	4	0x00 00 01 B7

Fig. 3.4.7: DCD Insertion Location in Image (MPEG1 Video) Media

10

(3) Video media (MPEG2)

MPEG2 is also comprised of six levels, and is fundamentally the same as MPEG1.

(3-1) MPEG2-PS

- 15 The same as MPEG1 System in (2-1)

(3-2) MPEG2-Video

The same as MPEG1 Video in (2-2)

(3-3) MPEG2-TS

UD for MPEG2 Video sequence layer in (2-2)

- 20 (Achieved by multiplexing after AV separation using a tool that enables MUX/DEMUX (such as MP-Factory 3.0)

and insertion of DCD into the video.)⁷

(4) Video media (Advanced Streaming Format™ ASF)

- Insertion method

- 5 Create original attributes in the Extended Content Description Object, set the value, and insert. (Achieved by inserting DCD using Microsoft’s Format SDK). Any number of original attributes can be inserted. Locations for insertion of DCD in the file after creation of the Microsoft package, and insertion of DCD in the case of DRM will be stipulated at a later date.

10 **(5) MPEG-1/2 Audio Layer III media (MP3)**

- Insertion method

Copy the first frame of the audio data sample, insert the identifier and unique code, and insert this into the first frame. Figure 3.4.8 shows the DCD insertion location for audio media (MP3).

Header	Error check (option)	Audio Data			
		Allocation	Scale factor	Sample	
				First frame (User Data)	Frame
				DCD-EF	

15 **Legend**

Item	Explanation	Length (bytes)	Code value
Header	Audio configuration information	4	-
Error check	Error check data	-	-
Allocation	Allocation information	-	-
Scale factor	Scale factor information	-	-
Allocation	Allocation information	-	-
Frame	Minimum unit for storing audio data	-	-
DCD-EF	Shown in Table 3.4.2	-	-

Fig. 3.4.7: DCD Insertion Location in Audio (MP3) Media

3.4.7.3 Separate model

The Separate Model is defined that the DCD is separated from the main body of the package of digital content and distributed as a separate file. Details of this model are defined as below.

20 **(1) Description model**

XML description.

⁷For the insertion of the DCD into the sequence layer or GOP layer of MPEG 1/2 video media, consideration must be given to transcoding, etc., when sending via a system that is synchronized with the network.

(2) Tag name definition

Details of the tag names in the DCD using XML description are defined in Table 3.4.5. Figure 3.4.9 shows the specific XML expression text.

5

(3) Methods of linking with the main body of the package of digital content

One of the following is recommended:

- Using the same file name with an appropriate extension (e.g.: ABCDE.mpg – ABCDE.dcd)
- 10 □ Conversion into a single file using ZIP, Tar, Winzip, Lzh, etc although this solution can only be applied to certain limited situations. (More robust methods of association of digital content and metadata are discussed in later Chapters)

Table 3.4.5 Tag name of DCD in the Separate Model

1: No abbreviations are allowed for date notation (minutes, seconds, etc.) (must be complete)

Attribute element				Tag name*9	Tag name*9	Max. length	Description model (numbers in brackets are examples)
Large	Medium	Small	Fine				
Route element				CIDFDCD	cIDfDCD		
Profile Information				DCD_PROFILE	DCDProfile		
	Profile no.			DCD_PF_ID	DCDPfID	2	Hexadecimal ASCII
	Version no.			DCD_PF_VERSION	DCDPfVersion	2	Hexadecimal ASCII
DCD issuing time stamp				ISSUEDATE	IssueDate	DATE format	[1997-07-16T19:20:30+01:00]*0
				CIDFMAIN	cIDfMain		
IPR-DB element	Unique code (combined)			UNIQUE_ID	UniqueID	256	Hexadecimal ASCII (MAX 128B) Insert "/" between Center no. and Center Intranumber
	Unique code (separated)	Version information /type		UNIQUE_ID1	UniqueID1		
		Area code		VERSION	Version	10	Hexadecimal ASCII
		Center no.		REGION	Region	10	Hexadecimal ASCII
		Center Intranumber		CENTERNUMBER	CenterNumber	17	Hexadecimal ASCII
		Center Intranumber		INTRANUMBER	IntraNumber	128	Hexadecimal ASCII
	Part of IPR-DB category						
	System control			SYSTEMCONTROL	SystemControl		
		Electronic watermark		WATERMARK	Watermark	64	Hexadecimal ASCII*3
		Content hash	Hash method	HASH	Hash		
	Hash value*1		HASH_METHOD	HashMethod	2	Half-size numerals(1,2,3 . .) *4	
			HASH_VALUE	HashValue	256	Hexadecimal ASCII*5	
System control				DCD_SYSTEMCONTROL	DCDSystemControl		
	Security level			SECURITYLEVEL	SecurityLevel	2	Half-size numerals(0,1,2,3 . .) *6
	Digital signature*1	Signature method		SIGNATURE	Signature		
		Signature value*1		SIGNATURE_METHOD	SignatureMethod	2	Half-size numerals(1,2,3 . .) *7
			SIGNATURE_VALUE	SignatureValue	512	Hexadecimal ASCII *8	
DCD free area*2				DCDFREEAREA	DCDFreeArea	unlimited	Express freely *9

2: This area allows free changes to be made by the user after the DCD is issued, and is outside the scope of the digital signature

3: Assign Watermarking method numbers in order from 1

*4: Assign hash method numbers in order from 1 (SHA-1 method is selected as “1” in Ver. 2.0)

5: The signature area is the full area for the main body of the DCD except for the area inside the signature tag (<SIGNATURE>) and inside the DCD free area tag (<DCDFREEAREA>)

6: Assign security number (0, 1, and 2 in Ver. 2.0)

7: Assign signature method numbers in order from 1 (Ver. XML-SIGNATURE2000/07/11 is selected as “1” in Ver. 2.0)

8: Up to 2048 bits are possible

*9: Capitalization of the first letter of each word is recommended, but the use of all caps may be acceptable

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```

<?xml version="1.0" encoding="Shift_JIS"?>
<!--General DCD in Separate Model-->
<CIDFDCD>
  <ISSUEDATE>2001-08-30T19:20:30+01:00</ISSUEDATE>
  <CIDFMAIN>
    <UNIQUE_ID>F011/123456789ABC</UNIQUE_ID>
    <UNIQUE_ID1>
      <VERSION>F</VERSION>
      <REGION>0</REGION>
      <CENTERNUMBER>11</CENTERNUMBER>
      <INTRANUMBER>123456789ABC</INTRANUMBER>
    </UNIQUE_ID1>
    -----
    Items used in registration to IPR-DB
    -----
    <DCD SYSTEMCONTROL>
      <WATERMARK>1</WATERMARK>
      <HASH>
        <HASH_METHOD>1</HASH_METHOD>
        <HASH_VALUE
ENCODING="base16">84AB4C9F35AC347DE</HASH_VALUE>
        </HASH>
      </DCD SYSTEMCONTROL>
    </CIDFMAIN>
    <DCD SYSTEMCONTROL>
      <SECURITYLEVEL>2</SECURITYLEVEL>
      <SIGNATURE>
        <SIGNATURE_METHOD>1</SIGNATURE_METHOD>
        <SIGNATURE_VALUE
ENCODING="base16">AEF9487BCE9D35A93F14CE</SIGNATURE_VALUE>
        </SIGNATURE>
      </DCD SYSTEMCONTROL>

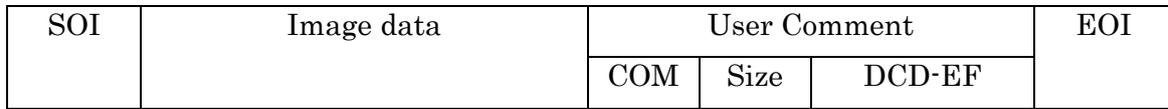
    <DCDFREEAREA>MEMOMEMOMEMOMEMOMEMOMEMEMO</DCDFREEAREA>
  </CIDFDCD>

```

Fig 3.4.9: Example of XML message used in the Separate Model

[Hash verification 1]

3. Hash calculation



Hash verification areas (scope indicated by arrows)

5

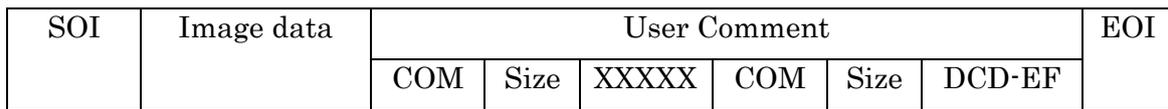
4. Hash Verification

Verification of the package of digital content is based on a comparison of the hash value derived from (1.) and the hash value that appears in the main body of the DCD.

10 [Hash verification 2]

When there is an Aggregator/Distributor metadata area generated after DCD embedding (2.).

5. Hash calculation



Hash verification area (scope indicated by arrows)

15

XXXX: Information added by Aggregator/Distributor (begins with "CIDU")

6. Hash Verification

Verification is based on a comparison of the hash value derived from (1.) and the hash value contained in the main body of the DCD.

20

Fig. 3.4.10: Hash Value Calculation and Verification

Adopting the Secure Hash Algorithm-1 method, as the mechanism for hash calculation, the hash number associated with all packages of digital content files (except the DCD as described above) is "1". This is the value set for the "System control attribute, content hash value, hash method" attribute in the IPR-DB.

25

3.4.7.5 Security levels

Table 3.4.6 defines the security levels described within the DCD tag <SECURITYLEVEL>. The security levels differ depending on whether a package of digital content file has been ascribed a hash value and/or a digital signature. The security level indicator is held within the DCD with a higher number indicating a higher level of security (i.e. the use of a hash value and a digital signature represent the highest level of security).

30

Table 3.4.6: Security Levels

		Digital Signature?	
		No	Yes
Hash?	No	0	1
	Yes	0	2

The degrees of security for each of the levels in the above table are outlined below:

Security Level 0: There is no protection of the package of digital content data or protection against metadata alteration, metadata replacement or Content ID (CIDCMN) alteration. This approach is adequate in certain secure applications or communication environments or where a certain level of security has already been assured through other means, or, in cases where security of the package of digital content and metadata is not a requirement.

Security Level 1: This approach can maintain protection against metadata and Content ID (CIDCMN) alteration, but is not effective against alteration of packages of digital content data or metadata replacement.

Security Level 2: In addition to the protections granted under Security Level 1, this approach is effective against alteration of packages of digital content data and metadata replacement⁸.

3.5 Digital watermarking

3.5.1 Strategy for using watermarks

Digital watermarking embeds metadata into packages of digital content by changing the digital content in a way that is almost imperceptible in normal use. Digital watermarking has the following properties:

- (i) It is difficult to remove the embedded metadata within the watermark from the package of digital content. In contrast it is often easy to remove metadata that was attached to the package of digital content by alternative methods (including, for example, DCD metadata in a file header).
- (ii) The more metadata that is embedded within the watermark, the more degradation of the

⁸ If the package of digital content is altered where only the hash value protection and no digital signature is present it may not be possible to detect the alteration. This is because the hash value algorithm is public, so it is possible to apply the hash value algorithm to the altered digital content, and change the hash value based on the figure derived from the new digital content (so that the hash value matches the digital content)

package of digital content will occur. For example, current watermarking techniques for images can embed, at most, 150 bits in a 256x256 pixel area without conspicuous degradation.

- 5 (iii) Slight degradation cannot be avoided completely even when the amount of the embedded metadata is small.

CIDf uses watermarking as follows:

- 10 (i) The function of watermarking is to facilitate the detection of illegally distribution or exploitation of packages of digital content from which DCDs have been removed. Packages of digital content could be illegally distributed or exploited after the DCD has been removed. In these circumstances it is clear that the DCD itself cannot be used as a tool to enable detection of this type of infringing action. Therefore watermarking needs to be used. Technology products exist, which might be called “Net-Watchers”, which
15 interrogate watermarks embedded into packages of digital content and through the identification of the package of digital content is able to assist in detecting when it is being illegally distributed or exploited.
- (ii) Embedded Content ID (CIDCMN)
20 To keep the amount of embedded metadata within the watermark small, the Content ID (CIDCMN) is embedded. All the relevant metadata about a particular package of digital content can be obtained by interrogating the IPR-DB using the Content ID. The number of bits necessary to express a CIDCMN is currently 64.
- (iii) Optional Use
25 Watermarking cannot be used for applications where content quality is a primary requirement, because watermarking will always degrade digital content quality to some degree.

3.5.2 *Method for using watermarks*

5

Figure 3.5.2 illustrates the cIDf method of applying watermarks to packages of digital content. The watermark is embedded by the CIC. As the CIC may store items or packages of digital content on behalf of Rights Owners and Aggregators/Distributors, the CIC can embed the CIDCMN into the packages of digital content when requests for exploitation are received from an Aggregator/Distributor before sending those packages of digital content to the Aggregator/Distributor.

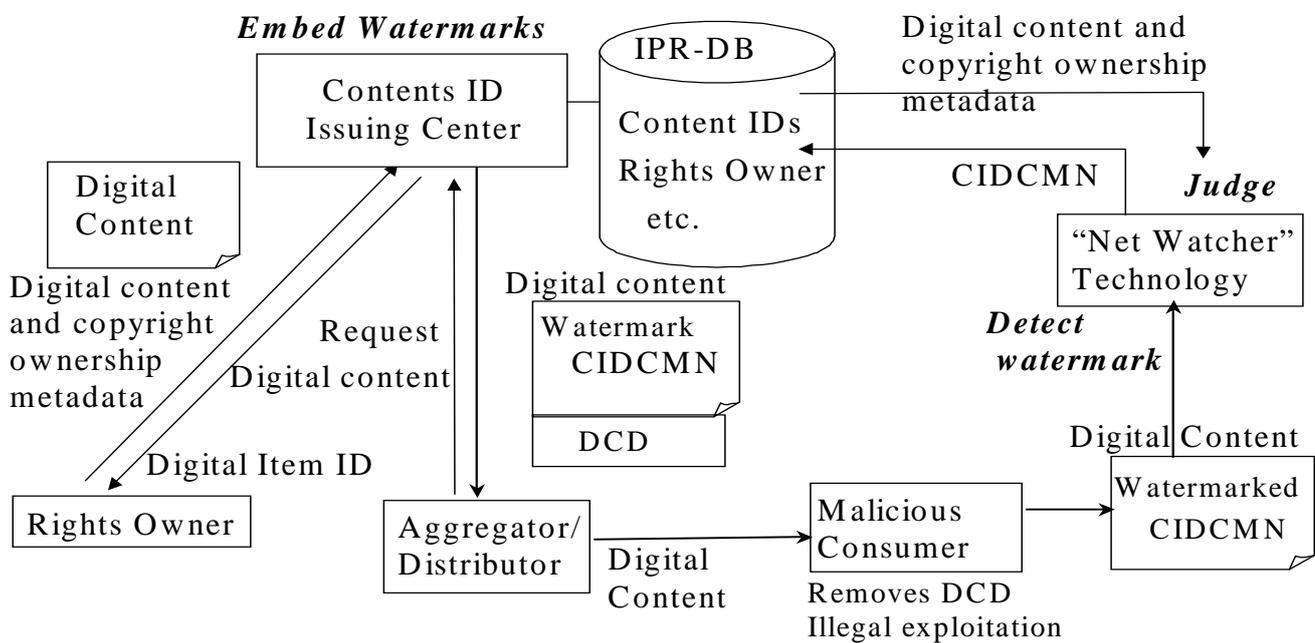


Fig. 3.5.2 Method of using watermarks

3.5.3 *Watermarking methods*

Each of watermarking methods has different advantages and disadvantages, and the selection of watermarking method will depend on a user's specific requirements. For example, one watermarking method might be better in detection reliability while another might be better in detection speed. It is therefore appropriate to permit each
5 CIC to select the best watermarking product according to its users' requirements. However, there does need to be some control over the techniques used, in order for the system as a whole to operate effectively and be credible. Therefore a process of defining minimum acceptable requirements for watermarking technologies will be instigated by cIDf itself as follows:

- 10 (i) CIDf will devise a set of criteria for the evaluation of different watermarking techniques. These criteria would represent the minimum requirements for any watermarking technologies employed in the system. Any technologies not meeting these minimum requirements will be rejected.
- 15 (ii) CIC may adopt any watermarking technology has satisfied cIDf criteria. The CIC will register their choice (or choices) of watermarking technology with cIDf.

3.5.4 *Meta-watermarking*

cIDf proposes the use of two types of watermarks. The "real" watermark will contain the CIDCMN and will be embedded in packages of digital content using a variety of different cIDf-approved watermarking technologies as described above. The "meta" watermark will contain metadata about the watermarking technology used for the
20 real watermark and will be a standardized application for all digital content media types.

This approach is required precisely because of the intention to use a variety of different watermarking technologies in different circumstances. For the detection technology to work effectively it needs to be able to detect which watermarking technology has been used to embed the "real" watermark in the particular package of
25 digital content being scanned. The use of a meta- watermark provides a solution to this problem. This process can be summarized as follows:

- (i) Use both "real" watermark and a "meta"-watermark
- 30 (ii) The "real" watermark is used to embed the CIDCMN and any cIDf approved watermarking technology may be used.
- (iii) The meta-watermark is used purely to embed metadata about the method of digital content watermarking being used. The specification of the meta-watermark is standardized.
- (iv) "Net-Watcher"-type applications interpret the meta-watermark in order to determine

the "real" watermarking technology being used and are then able to detect the "real" watermark containing the CIDCMN.

3.6 The Content ID Issuing Center (CIC) and the IPR database (IPR-DB)

5 This section describes the functions of the Content ID Issuing Center and the IPR database (IPR-DB) and the

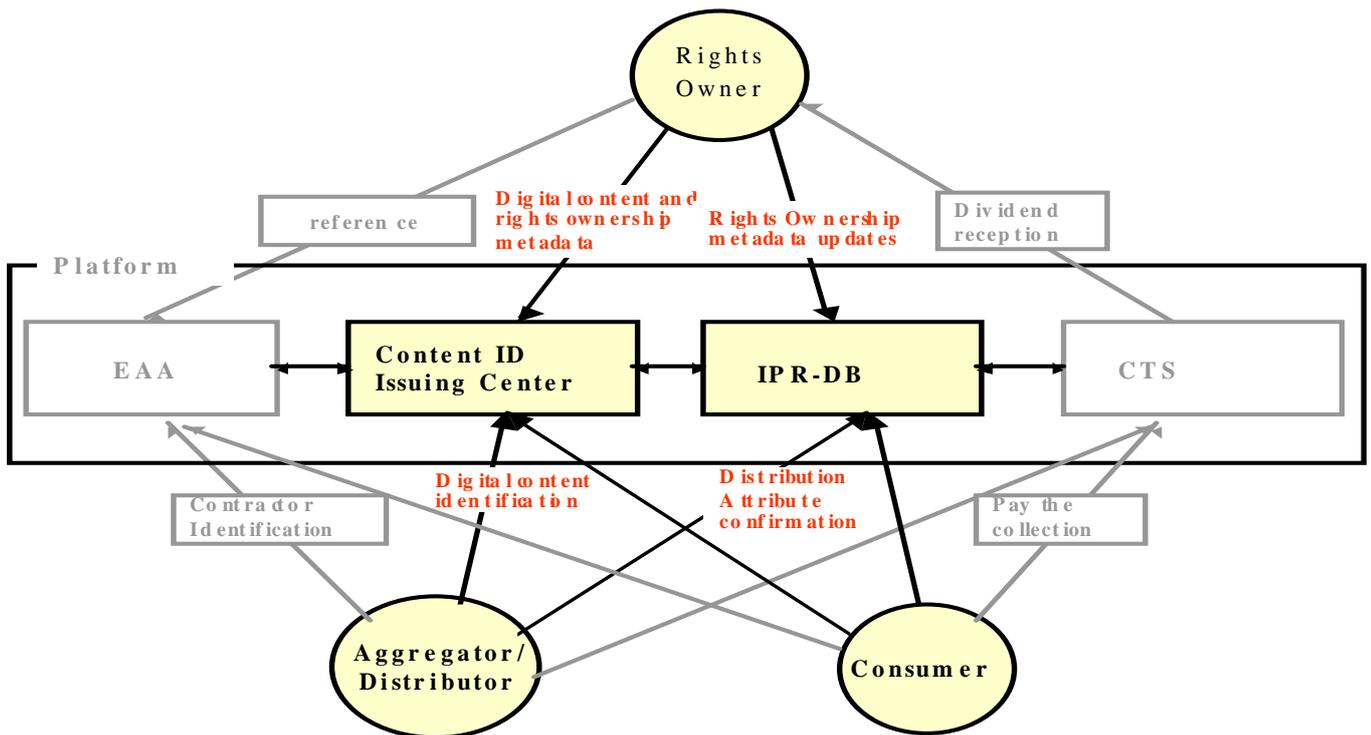


Fig. 3.6.1.1 The metadata flow between the CIC, the IPR-DB, and other players.

metadata flow between them and with other players. Fig. 3.6.1.1 illustrates the metadata flow.

3.6.1 The functions of the Content ID Issuing Center

The CIC has two functions. The first is the issuing Content Ids and the second is a metadata retrieval.

10 3.6.1.1 Content ID issuing function

The Content ID issuing function consists of issuing to the appropriate Rights owner a Content ID (Digital Item ID) in respect of a unique item of digital content and issuing a Content ID (Content ID Center Management Number) to an Aggregator/Distributor for watermarking purposes. The first involves the issuing of a Content ID (Digital Item ID) for each registered item of digital content. The latter involves issuing a Content ID (CIDCMN) at the request of an Aggregator/Distributor who is planning to distribute a package of digital content containing an item(s) of digital content for which the appropriate permission of the relevant Rights Owner(s) has been granted.

15

The CIDCMN is associated with appropriate distribution attribute metadata. Figure 3.6.1.2 shows the flow of these two activities.

5 The Content ID (Digital Item ID) issuing function is triggered by the registration of a new item of digital content and a request for a Content ID (Digital Item ID). The CIC then authenticates the Rights Owner through the EAA and then determines by virtue of its own operating rules whether or not it should issue a Content ID (Digital Item ID). If the CIC decides to issue a Content ID (Digital Item ID), it generates the new Content ID (Digital Item ID) and registers it with the IPR database, with the associated digital content metadata supplied by the Rights Owner. The CIC then sends a confirmation of registration to the Rights Owner. Fig. 3.6.1.3 shows each of these steps.

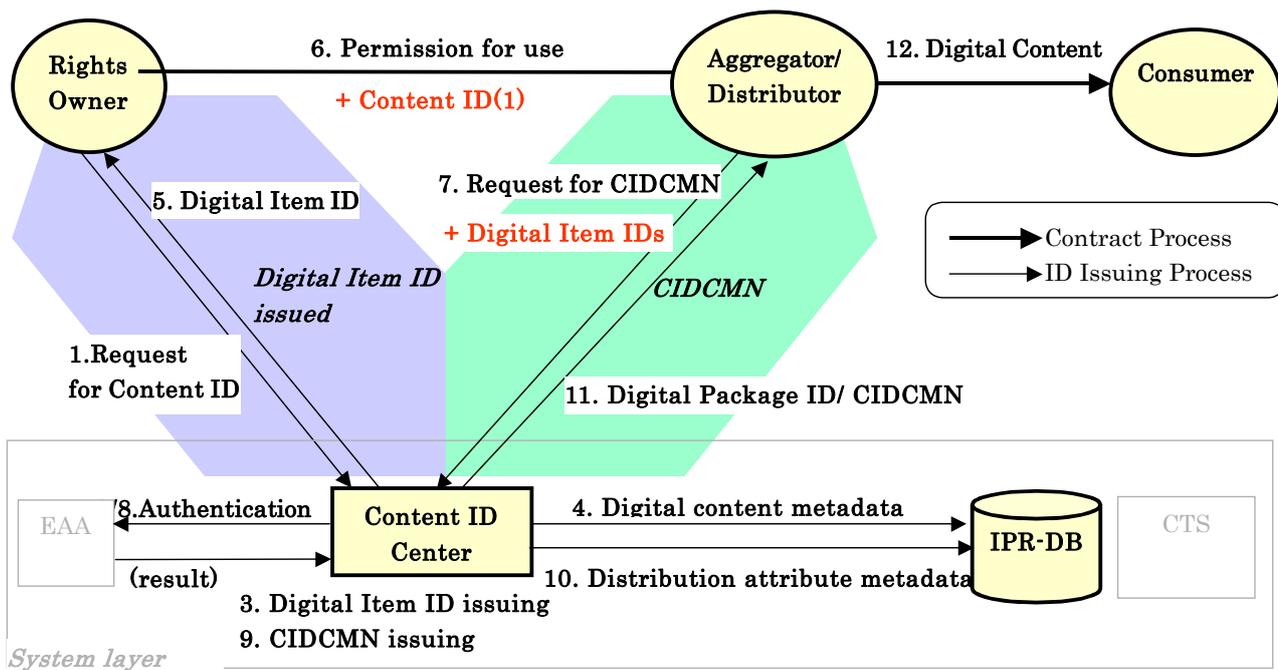


Fig.3.6.1.2 The flow of Content ID Issuing function

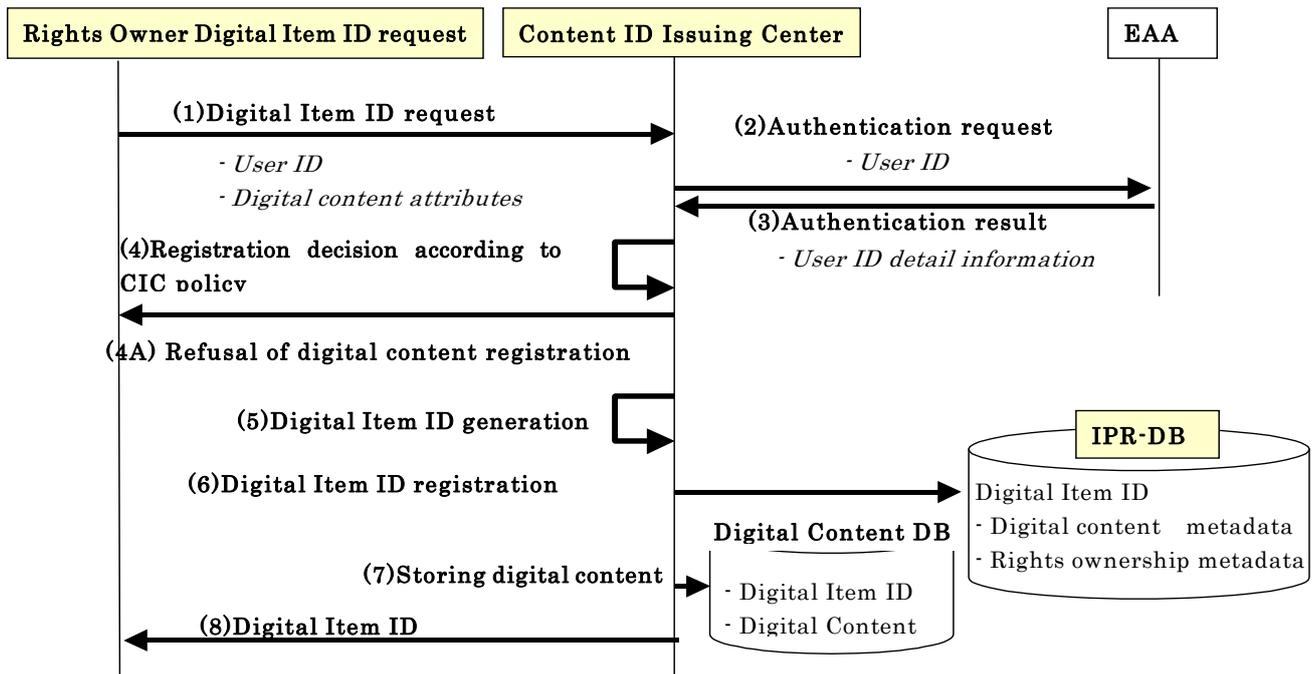


Fig. 3.6.1.3 The process of Content ID (1) issuing

(1) Content ID (Digital Item ID) request

The Rights Owner sends a **Content ID (Digital Item ID) request** to the CIC using the protocol and format specified by the CIC. The request includes the Rights Owner's User ID, metadata identifying and describing the item of digital content to be registered, and any other metadata the
 5 CIC may require. The User ID identifies the Rights Owner requestor uniquely, and this identity can be verified through the Electronic Authentication Authority (EAA).

(2) The request for authentication

The CIC inquires of the EAA authentication of the User ID.

(3) The authentication request result

10 The EAA confirms the validity of the Rights Owner's User ID to the CIC.

(4) Registration Decision

Whether or not an item of digital content registration request is accepted by the CIC is dependent on a number of factors. These include whether or not the Content ID (Digital Item ID) request conforms to the CIC protocols, whether or not the Rights Owner's User ID is confirmed by the EAA,
 15 and whether or not the request conforms to the individual Content ID (Digital Item ID) issuing policy specified by each CIC. Based on these criteria, the CIC decides whether or not to issue a Content ID (Digital Item ID) identifying the item of digital content. If the CIC decides to register the Content ID (Digital Item ID), then the CIC follows the process described below. If not, the CIC notifies this decision (with an explanation) to the Rights Owner.

20 (5) Content ID (Digital Item ID) generation

The CIC generates a Content ID (Digital Item ID) for the accepted item of digital content.

(6) Registration of the Content ID (Digital Item ID)

The CIC registers the Content ID (Digital Item ID) and the associated metadata supplied by the Rights Owner with the IPR-DB.

5 **(7) Registration of the item of Digital content**

Each CIC will have its own policy about storing items of digital content themselves. If the policy is to do so, the CIC stores the item digital content on the Digital Content Database.

(8) Content ID (Digital Item ID) registration confirmation

10 The CIC confirms the registration and identity of the Content ID (Digital Item ID) to the Rights Owner.

The Content ID (CIDCMN) issuing function is triggered by a request from an Aggregator/Distributor to the CIC. The CIC decides whether it should issue a Content ID (CIDCMN) or not. If it decides to do so, it generates a Content ID (CIDCMN), and a new DCD, in respect of the specific package of digital content to be distributed by the Aggregator/Distributor. The CIC then registers the Content ID (CIDCMN) and all its associated metadata with the IPR-DB. Finally, the CIC generates a new digital file combining the package of digital content (where appropriate, watermarked with the CIDCMN), and a DCD (as described in Chapter 2), which includes the CIDCMN. This digital file is then forwarded to the Aggregator/Distributor. Fig. 3.6.1.4. shows this process. The order of Steps (5), (6), (7) in the diagram are not specified.

20

(1) The request for a Content ID/(CIDCMN)

25 The Aggregator/Distributor sends a Content ID (CIDCMN) request for a package of digital content which includes the Aggregator/Distributor User ID, one or more Content Ids (Digital Item Ids) assigned to the items of digital content which make up the package of digital content, and the distribution attributes describing the planned form of distribution and exploitation of the package of digital content. This is communicated by means of the specific protocol and format defined by each CIC.

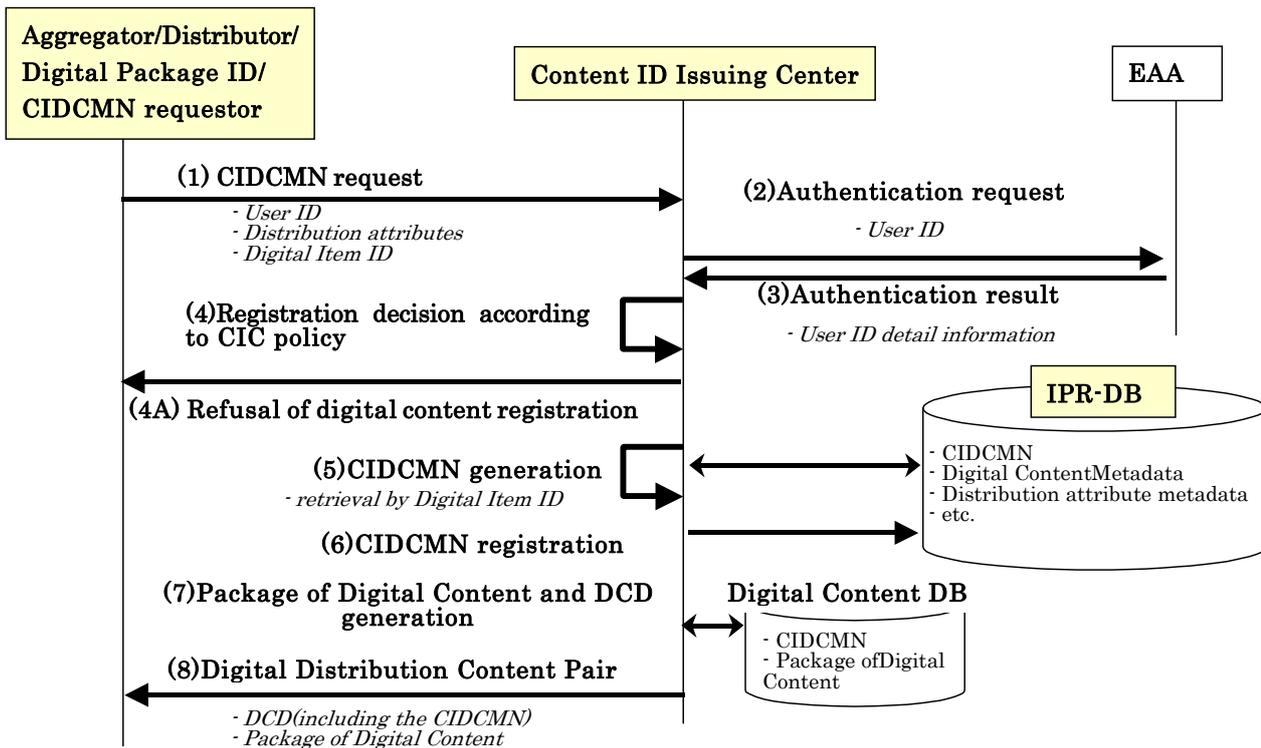


Fig. 3.6.1.4 The process flow for a (CIDCMN)

(2) The request for authentication

The CIC verifies the User ID with the EAA.

(3) The authentication request result

The EAA confirms the validity of the User ID of the Aggregator/Distributor to the CIC.

5 (4) Registration Decision

CIC checks if a Content ID (CIDCMN) registration request conforms to a number of factors. For example, whether or not the Content ID (CIDCMN) request conforms to the CIC protocols, whether or not the Aggregator/Distributor requestor's User ID is confirmed by the EAA, and whether or not the individual Content ID (CIDCMN) issuing policy specified by each CIC. Based on these criteria, the CIC decides whether or not to issue a Content ID (CIDCMN). If the CIC decides to register a new Content ID (CIDCMN) then the CIC follows the process below. If not then the CIC notifies this decision (with an explanation) to the Aggregator/Distributor.

(5) Content ID (CIDCMN) generation

15 The CIC retrieves metadata about the original item(s) of digital content that will make up the package of digital content for distribution from the IPR-DB by reference to the Content Ids (Digital Item Ids) included in the Content ID (CIDCMN) request. From this, the CIC generates a Content ID (CIDCMN) and new metadata, which describes the distribution attributes of the intended package of digital content. At the same time, it generates the Distributed Content Descriptor (as described in Chapter 2).

(6) Registration of the Content ID (CIDCMN)

The CIC registers the Content ID that consists of one or more Content Ids (Digital Item Ids) and the Content ID (CIDCMN), the metadata identifying the package of digital content for distribution and distribution attribute metadata with the IPR-DB.

5 (7) Digital Distribution Content Pair generation

The Digital Distribution Content Pair is the digital file created by the CIC combining the package of digital content with its DCD. Each CIC will have a policy specifying under what circumstances the CIC should watermark the content of the package of digital content. This will vary according to the nature of the item(s) of digital content contained in the package of digital content as well as the intended form of exploitation of the package of digital content. If the policy determines that the CIC should embed a watermark, this will contain the Content ID Center Management Number (CIDCMN), which is a concatenation of a Version Number, a Region Number, the CIC ID, and a Content ID Issuing Center Management Number that may consist of the relevant Content Ids (Digital Item Ids). In other words, if it is the policy of the CIC to store the actual Digital Content Distribution Pair, the CIC will store a copy of the Digital Content Distribution Pair on the Digital Content Database as well.

(8) Sending the Digital Content Distribution Pair

The CIC sends a copy of the Digital Content Distribution Pair (which consists of the package of digital content for distribution and the DCD) to the Aggregator/Requestor.

20 3.6.1.2 Content ID Issuing Center Metadata Retrieval Function

The Content ID Issuing Center Metadata Retrieval Function is the service that, through the mechanism of the User ID, authenticates the level of metadata access each player in the digital content distribution chain is allowed. Assuming appropriate authentication is received from the EAA, the CIC retrieves the metadata requested from the IPR-DB, and supplies the resulting metadata request to the relevant player. Fig. 3.6.1.5 shows these processes.

25 The detail of this function is as follows:

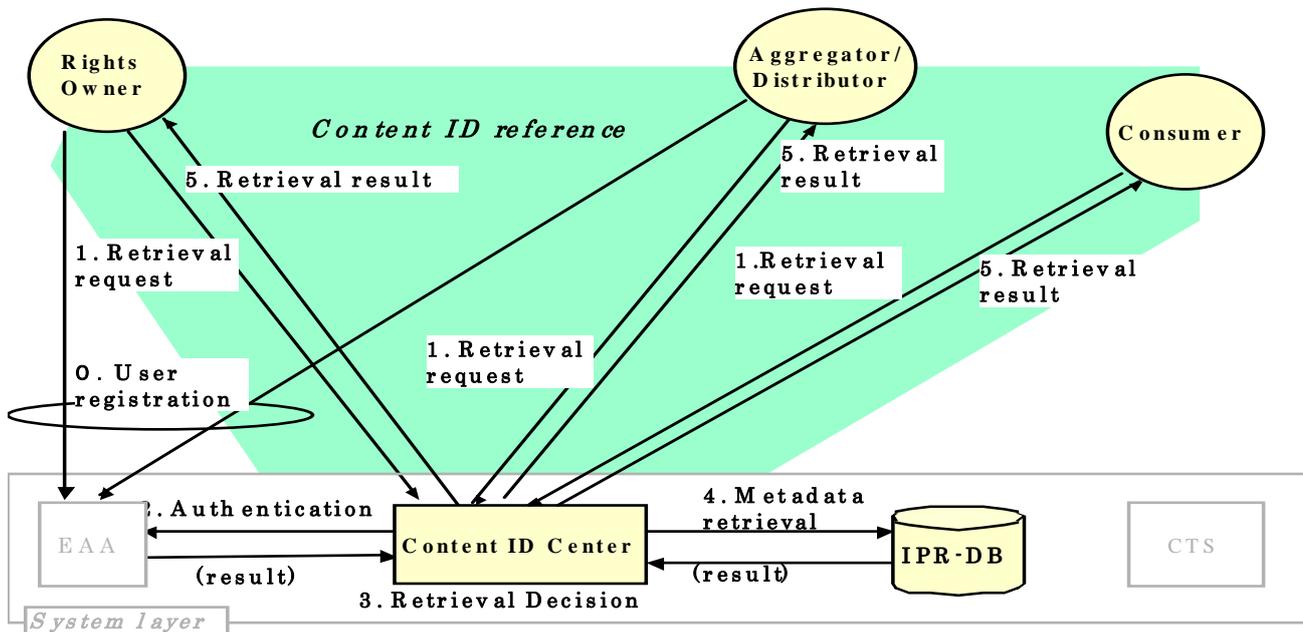


Fig. 3.6.1.5 Process of Content ID Issuing Center Metadata Retrieval function

(1) Retrieval request

A retrieval request consists of a description of the requested metadata and the requestor's User ID. If the request conforms to the CIC request protocol then the CIC continues with the authentication process, in (2) and (3) below.

5 (2) The request for authentication

The CIC inquires of the EAA authentication of the User ID.

(3) The authentication request result

The EAA confirms the validity of the User ID to the CIC.

(4) Retrieval Decision

10 The CIC decides whether to permit retrieval and supply of the requested metadata or not. This decision is determined by the IPR-DB and Digital Content DB access policy, the CIC metadata retrieval policy, and the operating contracts between all three entities.

(5) Retrieval matching

15 If these policies permit the retrieval and supply of the requested metadata on behalf of the specific requester, the CIC matches the metadata request against the IPR-DB and/or the Digital Content DB in accordance with the access and retrieval policies. If not then the CIC notifies this decision with an explanation to the requestor.

(6) Generating the retrieval result

20 Once the match is undertaken, the IPR-DB or Digital Content DB generates the approved retrieval result in accordance with the retrieval and access policies and the operating contracts between the

IPR and Digital Content DB's and the CIC.

(7) Sending the retrieval result

The IPR-DB or Digital Content DB then sends the retrieval result generated at step (6) to the requestor.

- 5 As an alternative to this process, where a CIC stores digital content on behalf of Rights Owners in the Digital Content Database, it would be possible to use the watermark detection system containing the CIDCMN to enable retrieval of the appropriate metadata.

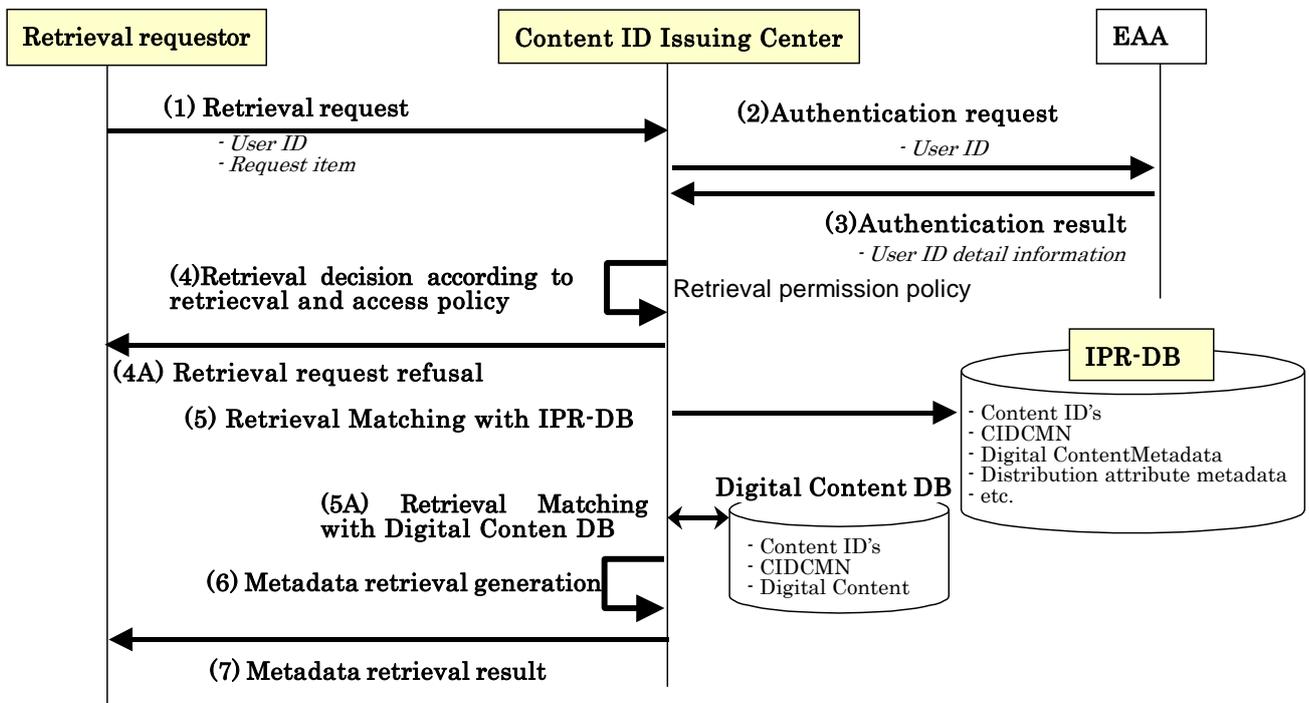


Fig. 3.6.1.6 The flow of the CIC metadata retrieval function

3.6.2 *Functions and architecture of the IPR-DB*

The IPR database performs the registration, storage, updating and retrieval of metadata functions within the cIDf specification. The registration and updating of metadata can only be undertaken, and the metadata subsequently accessed, by certain players within the digital content distribution chain, in accordance with their individual access authority levels specified in their registration with the CIC. The retrieval of metadata function can be undertaken by any of the players in the digital content distribution chain subject to the policies and access rule limitations detailed in Section 3.6.1 above.

3.6.2.1 *Functions*

This section examines two of the functions of the IPR-DB.

10 **A. Registration function**

The IPR-DB will only accept a request from a CIC that has been registered with the EAA. The appropriate CIC can register and update metadata associated with a particular Content ID (Digital Item or CIDCMN). This would include such metadata as rights ownership attributes, distribution attributes, and other metadata that appears in the DCD. The key data attributes, which enable the management of these attributes, are the Content Ids and the Content ID Center Management Number. Sec. 3.6.1 describes the registration flow.

B. Retrieval function

Fig. 3.6.2.1 shows the retrieval function of the IPR-DB.

(1) Retrieval request function

20 A retrieval request will include a list of the metadata items requested and the requestor's User ID. If the request conforms to the IPR-DB request protocol then the IPR-DB will continue with the retrieval request authentication process set out in (2) and (3) below.

(2) The request for authentication

The IPR-DB inquires of the EAA authentication of the User ID.

25 **(3) The of authentication request result**

The EAA confirms the validity of the User ID to the IPR-DB.

(4) Retrieval Decision

The IPR-DB decides whether to permit retrieval and supply of the requested metadata or not. This decision is determined by the IPR-DB access policy. If the policy permits retrieval and supply of the metadata, the IPR-DB proceeds with the following steps. If the policy does not permit retrieval and supply, the IPR-DB notifies the requestor with an explanation for the refusal.

30 **(5) Retrieval matching**

If the policy permits retrieval and supply, the IPR-DB matches the requested metadata items with the database and extracts them for supply to the requestor.

(6) Sending the retrieval result

The IPR-DB sends the metadata retrieval result generated in step (5) to the requestor.

3.6.2.2 Structures

The cIDf Specification does not define architecture for the IPR-DB. The cIDf Specification requires as a minimum that the database architecture enables the storage and retrieval of any of the metadata attributes specified in Chapter 4.

3.6.3 Protocol

The cIDf Specification does not define the protocol(s) that are to be used for communication of data between the

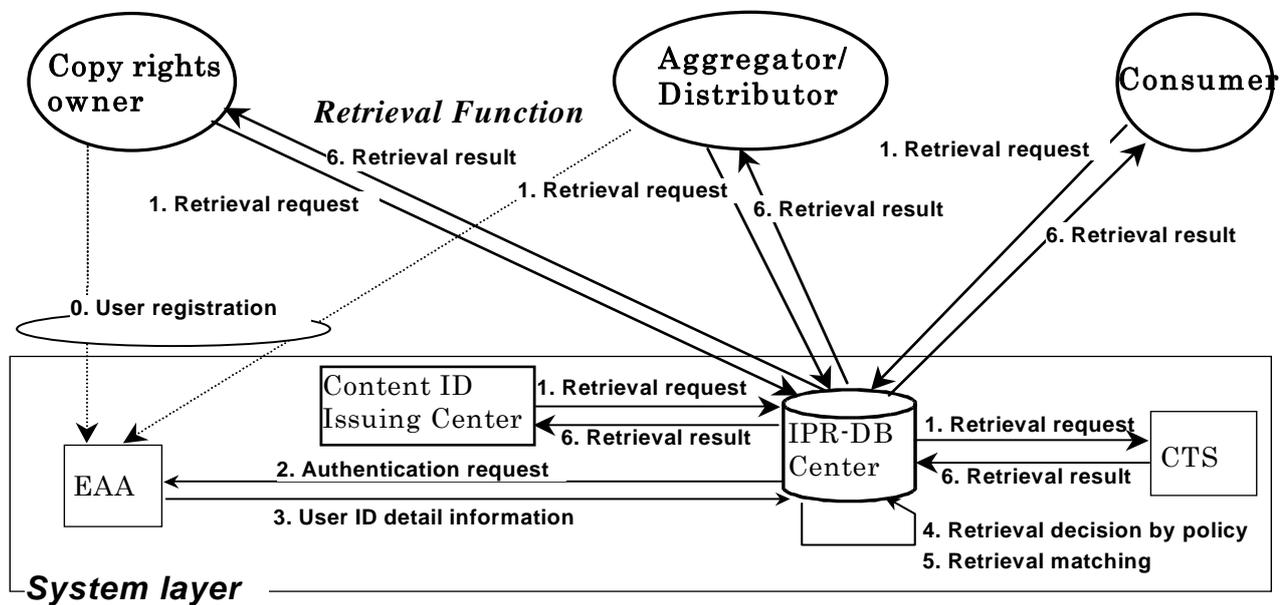


Figure 3.6.2.1 Retrieval function of the IPR-DB

CICs and the IPR-DBs, or indeed between any of the other players in the Reference Model. The specification of protocol(s) is defined in the contracts between the various players. The consequence of this is that the CICs and the IPR-DBs specify a protocol as part of their services. The other players then select the CIC and the IPR-DB that specifies a protocol which best meets their requirements. However, it is anticipated that the protocol(s) that will be used by the CICs and IPR-DBs will be based on a Public Key Infrastructure.

3.6.4 Technical Requirement

Tables 3.7.4.1 and 3.7.4.2 itemizes the minimum requirements that the CICs and the IPR-DBs must meet, under the cIDf Specification.

Functions	Requirements
Content ID issuing	
uniqueness	1. A Content ID Center Management Number must be globally unique identification of the IPR-DB which stores the Content IDs and their associated metadata
security	If the Content ID Centre stores digital content in a Digital Content DB, the Content ID Center must have security protection mechanism sufficient to prevent theft or alteration of the digital content.
authentication	The Content ID Centre should only issue Content ID (CIDCMN)s to Aggregator/Distributors who are properly registered with the EAA and whose User ID has been validated by the EAA and who have been given a valid licence from the Rights Owner to exploit the digital content.
Content ID retrieval	
uniqueness	A Content ID Center Management Number must uniquely identify the Content ID Center with which the Digital Content is registered.
security	The IPR-DB must have security protection mechanisms which prevent unauthorised access to the metadata contained in the IPR-DB

Table 3.6.4.1 Minimum Functionality of the Content ID Center

Functions	Requirements
IPR-DB metadata retrieval	
security	made by Content ID Centers which have been previously registered with the IPR-DB.
	mechanisms to prevent the falsification, alteration, and deletion of the metadata.
	3. The IPR-DB must have adequate security protection mechanisms to prevent unauthorized access to the metadata contained in the IPR-DB.

Table 3.6.4.2 Minimum functionality of the IPR-DB

5 3.7 Consumer

3.7.1 The role of a Consumer

The functions that Consumers may undertake are the following:

- (i) Acquire packages of digital content from an Aggregator/Distributor
- (ii) Confirm the validity of both the package of digital content and its DCD
- 10 (iii) “Consume” the package of digital content
- (iv) Access and display the metadata attributes of the package of digital content
- (v) Request metadata retrieval from the IPR-DB and access and display the result

- (vi) Request the identification of the metadata contained within the watermark from the CIC whilst leaving the watermark intact.

3.7.2 *Devices and Terminals*

Digital Content Device

- 5 The digital content device consists of software or hardware that enables the consumption of packages of digital content. The functionality of different digital content devices is not specified here.

DCD and the digital content terminal

- 10 It is an assumption that the consumer possesses software and/or hardware, those which enable access to and rendering of the DCD and the package of digital content. The combination of software and/or hardware, which enables these functions, is called a “digital content terminal” in the remainder of this specification.

- 15 A digital content terminal enables the “acquisition” of the digital content from an Aggregator/Distributor, the access and display of the elements of the DCD, the validation of the package of digital content and the DCD, the performance of a retrieval request to the IPR-DB, and the performance of a request for the identification of the metadata contained in the watermark of a package of digital content to the CIC. Not all digital content terminals will be able to perform all of these functions (although this might be preferable) and a Consumer may require two or more digital content terminals in order to perform all of these functions.

- 20 The phrases “digital content device” and “digital content terminal” are abstract, and their specification can be separately defined. For example, in any given implementation of the cIDf Specification, it may be desirable to implement the functions of both the device and the terminal. This specification only defines the requirements for digital content terminals with regard to digital content protection and the enabling of digital content distribution.

3.7.3 *Acquiring the digital content from an Aggregator/Distributor*

- 25 A digital content terminal acquires a package of digital content by communicating with an Aggregator/Distributor in accordance with a Consumer’s initial digital content search and acquisition request. The functions that a digital content terminal undertakes in order to acquire a package of digital content are:

- 30 (i) Request acquisition of a package of digital content from an Aggregator/Distributor.
(ii) Receive the package of digital content from the Aggregator/Distributor.

The specific mechanisms of the acquisition request, the receiving of the package of digital content and the payment (or other transfer of “value”) by the Consumer are dependent on the protocol operated between a digital content terminal and an Aggregator/Distributor.

3.7.4 *Validation of the digital content and its DCD*

A digital content terminal determines the validity of both the DCD and the package of digital content through the use of digital signatures and/or hash value calculations. As a consequence the following functions cannot be carried out on the package of digital content in the absence of its DCD.

5

- (i) Validation of the digital signature in the DCD
- (ii) Comparison of the hash value calculated from the package of digital content and the hash value contained in the DCD.

10 By the application of this functionality, illegal distribution and exploitation, such as forgery of the DCD or the tampering with the package of digital content, can be discovered.

3.7.5 *Accessing and Displaying the metadata attributes of a package of digital content*

A digital content terminal accesses and displays the metadata attributes contained in the DCD. This function clearly cannot be performed if the DCD has been removed.

15 3.7.6 *Metadata retrieval request from the IPR-DB*

A digital content terminal will undertake metadata retrieval in accordance with a Consumer's request:

- (i) A digital content terminal requests metadata retrieval from the IPR-DB.
- (ii) The digital content terminal receives the result of the retrieval request from the IPR-DB.
- 20 (iii) The digital content terminal accesses and displays the result of the metadata retrieval request.

3.7.7 *Requesting the identification of the metadata contained in the watermark*

25 A digital content terminal can make a request to a CIC for the retrieval of the metadata embedded in the package of digital content by means of a watermark. The purpose of this function is to enable the validation of the package of digital content without a DCD.

- (i) A digital content terminal forwards a package of digital content, with a request for the retrieval of the metadata contained within the watermark, to any CIC.
- (ii) The CIC that receives the request retrieves the meta-watermark, which should enable retrieval of the "real" watermark containing the metadata, from the package of digital content. If the CIC that received the request is unable to retrieve the real watermark and the metadata contained in it, it will make a retrieval request to other CICs.
- 30

- (iii) The CIC forwards the result of the retrieval of metadata from the watermark to the digital content terminal. Any result of this nature would include a notification of success or failure in detecting a meta-watermark and/or a real watermark, the CIDCMN if it has been detected and any other metadata contained within the watermark.
- 5 (iv) The digital content terminal accesses and displays the result of the retrieval of metadata from the watermark request.

3.7.8 *The protocol for any communication*

Communication protocols are not yet defined.

3.7.8.1 *Additional functionality of Digital Content Terminal*

10 A digital content terminal must perform the following functions on packages of digital content and DCDs.

- (i) Validate the digital signature of the DCD
- (ii) Compare the hash value calculated from the package of digital content with the hash value contained in the DCD.

15

These functions are required to enable the detection of illegal modification of packages of digital content and/or the DCD.

3.8 **Detection of illegal use**

20 The goal of cIDf is to ensure the smooth operation (amongst the various players in the copyright layer of the Reference Model) of the production, distribution, and consumption of packages of digital content. One of the elements required to accomplish this target is the definition of all the metadata attributes associated with the package of digital content and, at the same time, the establishment of a mechanism which detects evidence of illegal acts involving tampering with the metadata or the package of digital content itself.

25 The following metadata elements are defined as being associated with the package of digital content in the form of file header metadata or DCD: the Content ID Center Management Number, description attributes relating to the item(s) of digital content, rights ownership attributes, distribution attributes, and some or all of the system data, which is required for the transmission of the package of digital content. At the same time, work is progressing with the creation of a system for the definition of the necessary scheme of digital content attributes.

30

The mechanisms that guarantee the validity of the package of digital content attribute metadata are shown in this section. This section itemizes potential illegal acts against packages of digital content in the context of the cIDf Specification, as well as the methods available for detecting such illegal acts. Of course, the assumption is that the CIC, the IPR-DB, the Rights Owners, or the Aggregators/Distributors don't conduct illegal acts either alone or in

a conspiracy.

3.8.1 *Types of illegal acts and detection mechanisms*

The following are examples of the illegal acts (or acts intended to facilitate illegal use) against packages of digital content that can occur in the context of the cIDf Specification:

5

- (i) Deletion of the DCD
- (ii) Replacement of the DCD
- (iii) Alteration of the DCD
- (iv) Use of the packages of digital content in a way that is not permitted in the distribution attributes defined in the DCD

10

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To some extent, these illegal acts will occur whenever digital content is distributed on networks. The impact of such illegal acts will be different depending on whether the Consumer is in receipt of a package of digital content which has already undergone one of the illegal acts detailed above, or whether the Consumer carries out the illegal acts themselves.

20

25

In the first of these two cases, the Consumer who has acquired a package of digital content which has been the object of an illegal act, but who intends to use the package of digital content legally, will attempt to obtain metadata describing the distribution attributes of the package of digital content from the DCD. If the DCD is attached to the package of digital content, it will be possible to determine whether or not illegal acts (ii) and (iii) listed above have occurred, by analyzing the cIDf standard DCD. Illegal acts (i) and (iv) will only be shown to have occurred because, without a DCD being present, it is impossible to determine the distribution attributes of a package of digital content without making enquiries and retrieval requests of other players in the chain. This would be true whether or not the package of digital content in question is based on the cIDf Specification. Illegal acts (ii) and (iii) above are therefore detectable by Consumers who are in receipt of illegal packages of digital content.

30

35

Next is an examination of the situation where the DCD is not attached to a package of digital content. If all the packages of digital content in the world were based on the cIDf Specification, then the package of digital content metadata, whether or not a DCD is attached to any particular package, could be obtained by making an inquiry to the IPR database. As this scenario is unlikely, it must be assumed that if a Consumer is in receipt of a package of digital content to which no DCD is attached, that Consumer will make a judgment that the package of digital content is not based on the cIDf Specification. As a consequence it is therefore possible that, through an inability to obtain distribution attribute metadata, because of previous illegal acts, even honest consumers of packages of digital content may inadvertently carry out the type of illegal act described in item (iv) above.

In the situation where the Consumer is knowingly carrying out illegal acts, it is possible for them to carry out any of the four illegal acts listed above. In view of the fact that not all packages of digital content will conform to the cIDf Specification, illegal acts (i) or (iv) described above are more difficult to detect than those described in (ii) and (iii). In the context of illegal use, Measures to prevent the illegal acts (ii) and (iii) above are certainly necessary, but an increasingly important issue will be the development of solutions to efficiently detect the occurrence of illegal acts (i) and (iv).

3.8.2 *Detection of illegal acts using “Netwatcher” technologies*

The detection of illegal acts is a critical outstanding issue requiring final resolution for cIDf. One method for the detection of illegal acts is the use of “Netwatcher” technologies. Such technologies are designed to detect through embedded watermarks the transmission source of illegal packages of digital content introduced onto a network, thus acting as a deterrent to the distribution of such illegal packages of digital content. Detection of illegal packages of digital content using Netwatcher technologies will not result in the prevention of the actual distribution of such packages of digital content, but the effective implementation of such a service could lead to a deterrent effect on the distribution of such packages of digital content.

CIDf believes that, among the various types of illegal acts that can occur to packages of digital content conforming to the cIDf Specification, there is a way of detecting the illegal acts described in items (i) to (iii) of Section 3.8.1 provided, through the use of CIDCMNs, the appropriate IPR-DB and Digital Content Database can be identified. This can be achieved by applying the following procedure to all packages of digital content:

- If there is no DCD attached to the package of digital content, determine whether a DCD is embedded in the package of digital content
- If no DCD exists, determine whether the package of digital content in question contains a media type(s) for which the use of watermark technology is possible.
- If the use of a watermark technology is possible for the media type(s), it should be possible to identify the content by reference to the CIDCMN in the watermark and matching this with the IPR database.
- In the case of a media type(s) for which the use of watermark technology is not possible the distributed package of digital content should be matched with the copy of the package of original digital content stored by the CIC in the Digital Content Database, or with the hash value calculation for the package of digital content stored on the Digital Content Database.

With regard to illegal act (iv), there will be packages of digital content that do not contain any distribution attribute metadata, and it is therefore impossible to determine what the permitted exploitations of that package of digital content are. Measures to combat this problem are required and might be determined amongst the various players in the Reference Model. However, this particular issue is outside of the mandate of cIDf. Therefore,

with regard to the identification of illegal packages of digital content, it will be possible to deter its distribution, for example, by monitoring packages of digital content on networks using Netwatcher technologies, but there is a limit to the number of packages of digital content that can be checked.

5 CIDf has not specified the Netwatcher technology functions, such as network search methods, database administration methods, and illegal content detection, as these represent the unique architecture of a particular Netwatcher technology application. It is anticipated that, in the same way that there will be a number of CICs, there will be a number of products fulfilling Netwatcher technology functionality. However, it would be preferable (for efficient systems operation) to standardize communication interfaces relating to Netwatcher technology functionality between the players detailed in the Reference Model.

4. *cIDf Metadata*

4.1 Functions of cIDf Metadata

cIDf Metadata consists of a Content ID (Digital Item ID), a unique identifier (CIDCMN) and a set of attributes which describe item(s) and package(s) of digital content (and the terms under which they are distributed), thus enabling effective digital content management and royalty (or fee) payments to the appropriate player(s). The addition of cIDf metadata to an item or package of digital content is at the discretion of the Creator, Copyright Owner or Aggregator/Distributor of the item or package of digital content.

CIDf metadata for packages of digital content has the following mechanisms which are designed to facilitate positive benefits in the formation and development of digital content distribution and network commerce. These also enable the identification of the item(s) of digital content which make up the packages of digital content.

- Content ID (Digital Item ID) – this identifier is used to identify items of digital content which will be contained in packages of digital content for distribution
- A unique identifier – the CIDCMN (the Content ID Center Management Number) which comprises: a Version Number, a Type Number, a Group Number, the Content ID Center Number and the CIC Internal Number which may consist of Content Ids (Digital Item Ids) identifying the relevant item(s) of digital content)
- The unique description of items and packages of digital content
- The description of the rights being asserted in any item(s) of digital content and the Right Ownership of such rights in item(s) of digital content
- The description of the distribution attributes for packages of digital content
- The facilitation of payment of royalties or fees to the appropriate player(s)

The use of digital watermarks and digital signatures to facilitate the detection of illegal acts in respect of packages of digital content is also defined within the cIDf Specification. The relationship between a package of digital content and the CIDCMN is shown in Fig. 4.1.

5
10



Figure 4.1: Relationship between a package of digital content, the CIDCMN, the DCD and retrieval of associated metadata.

4.2 The Benefits of cIDf Metadata

The following benefits can be achieved by using cIDf metadata in combination with the application software described in the systems layer of the Reference Model.

Application	Metadata required	Beneficial for Player		
		Creator/ Rights Owner	Aggregator/ Distributor	Consumer
1) Retrieve rights ownership metadata	Rights ownership attributes	√	√	√
2) Search for/retrieve packages of digital content	Digital Content item and package attributes	√	√	√
3) Trace steps in the distribution chain, support marketing	Distribution attributes	√	√	√
4) Reference digital content package usage rules	Distribution attributes	√	√	√
5) Mechanism for ensuring compliance with usage rules	System control information	√	√	
6) Validation of integrity of packages of digital content	System control information		√	√
7) Confirm digital content version history	Digital Content item and package attributes	√	√	√
8) Use for product identification	Digital Content package attributes		√	√
9) Use as mechanism to classify packages of digital content	CIDCMN	√	√	√
10) Enable payment of royalties or fees to appropriate players	Royalty or fee allocation attributes	√	√	√

4.3 Usage of Content ID (Digital Item ID and CIDCMN)s

Content IDs will be issued, and their associated metadata registered with the IPR-DB by a Content ID Management Center (CIC), under a number of circumstances. This may be as a result of a request for the issue of a Content ID (Digital Item ID) by a Rights Owner or a Content ID (CIDCMN) by an Aggregator/Distributor in the digital content distribution delivery chain. Below are some typical examples.

1) Copyright work (an item of digital content)	Assertion of ownership of an original work
2) A single item of digital content being offered for exploitation as a package of digital content	Package of Digital Content
3) Registration of an item or package of digital content in the Digital Content Database (archive)	Digital Content repository
4) Package of Digital Content, e.g. containing both a book and a movie	Package of Digital Content
5) Extract from a copyright work (item of digital content) such as 1 page, 1 chorus, 1 phrase, 1 scene	Excerpt of an item of digital content
6) A copyright work (item of digital content) which has been edited and derived from another copyright work	(Derivative) Item of digital content

4.4 Overview of cIDf Metadata

The Content ID framework allows us to manage the identifier (called “Content ID Center Management Number”) and contents. Each identifier is unique and has a one-to-one relationship with a package of digital content and the content’s metadata set. Unless otherwise stated, means the identifier is called “Content ID ”hereafter.

Content ID Center Management Number	Digital Content attributes	Rights Ownership attributes	Rights Contracts attributes	Distribution attributes	Royalties and fees Allocation attributes	Free area
-------------------------------------	----------------------------	-----------------------------	-----------------------------	-------------------------	--	-----------

- 15 □ **Content ID Center Management Number:** This attribute is a unique number identifying a package of digital content and includes a Version Number, a Type Number, a Group Number, a CIC Number and a CIC Internal Management Number
- **Digital Content attributes:** These attributes describe and identify the item(s) of digital content contained in the package of digital content by reference to the creator’s name, the digital content title, a digital content description and a categorization.
- 20 □ **Rights Ownership attributes:** These attributes identify the Rights Owner(s) of the item(s) of digital

content.

- **Rights Contracts Attributes:** These attributes identify the terms and conditions of any rights related contract in respect of item(s) or packages of digital content.
- **Distribution Attributes:** These attributes identify the terms under which the package of digital content may be exploited by a Consumer.
- **Royalties and fees apportionment attributes:** These attributes identify the players to whom any royalties or fees (or other “value”) derived from the exploitation of the package of digital content are due and the share of such royalties or fees each player should receive.
- **Free area:** This area is entrusted to the CIC to use for local application.

In addition to the above, there are also **System Control Attributes** which remain undisclosed to the distribution chain players and which are required for CIC operations. This includes, for example, digital signatures, digital watermarks, check digits, and content hash values

4.4.1 *Selective use of and Metadata sets*

Three phases are supposed in the use of content ID framework depending on the combined identifier and metadata selection.

P1: Only the identifier is used as Content ID. In this case, its bit length is free.

P2: Only the identifier is used as Content ID, and its bit length is a multiples of 4.

P3: The identifier whose bit length is a multiples of 4 and the metadata sets are used.

In P2, it is also possible to use the resolution system. In P3, the metadata sets mean the metadata sets specified by other standards as well as cIDf.

4.5 cIDf Metadata Sets

The following explains the cIDf metadata sets in more detail.

(1) Content ID Center Management Number (Unique identifier)

This unique identifier consists of a version number which indicates the format of the CIDCMN, a type number which indicates the version type at each version, a group number which indicates which group the relevant CIC belongs, a CIC number allocated by the Registration Authority (see Chapter 6) and uniquely identifies each CIC and a CIC Internal Management Number which identifies a package of digital content to which the CIDCMN has been assigned.

(2) Digital Content attributes

These attributes describe the item(s) of digital content that are contained in a package of digital content. The

attributes include the name(s) of the creator(s) that created each item of digital content; the place and time of their creation; a description of each item of digital content including its title; a description of the type and genre of each item of digital content; if the item of digital content is a derivative work, the title of the (item of digital content) from which it is derived; any other existing unique identifier (outside the cIDf specification) assigned to the item of digital content ; and any supplementary notes.

These attributes may be codified at the time that the item of digital content is created. However, the attributes are unlikely to be registered with the IPR-DB until some time after creation.

(3) Rights Ownership attributes

These attributes describe rights ownership with respect to each item of digital content. The attributes include the name(s) of the Rights Owner(s) and the legal rights (including moral rights) each Rights Owner claims in respect of the item(s) of digital content. The attributes may also include the name of any Rights Administrator acting on behalf of a Rights Owner including a contact person for either the Administrator or Owner for inquiries related to rights in the item of digital content; and any supplementary notes.

Furthermore, in circumstances where an Aggregator/Distributor is re-licensing another Aggregator/Distributor (where such right has been originally granted by the Rights Owner), the terms and conditions of that re-license will be described here.

These attributes may be codified when each item of digital content is created and/or when the contract for assignment between a Creator and a Rights Owner is concluded. However, the attributes will not necessarily be registered with the IPR-DB until some time after this.

(4) Rights Contract Attributes

These attributes describe the terms and conditions of any rights or digital content distribution related contracts in respect of items or packages of digital content between any of the various players in the digital content distribution chain (all B2B contracts).

These attributes are codified when the contract for of an item(s) or package(s) of digital content are agreed. However, the attributes may not necessarily be registered with the IPR-DB until some time after this.

(5) Distribution attributes

These attributes describe the ways in which a package of digital content may be exploited. The attributes include usage rules relating to, for example, the Consumer's ability to copy or modify the package of digital content, the period of validity of use of the package of digital content, any restrictions on the use of the package of digital content and limitations on the region of exploitation of the package of digital content.

These attributes are codified for the purposes of distribution between an Aggregator/Distributor and a Consumer (B2C type distribution) where the contents of the package of digital content have already been determined. However, the attributes may not necessarily be registered with the IPR-DB until some time after

this.

(6) Royalties and Fees Allocation

5 These attributes describe the name(s) of player(s) to whom any royalties and fees are due and the shares of such royalties and fees each should receive. The attributes include royalty and fee rates, and royalty destinations.

10 These attributes are created upon the conclusion of the contract for exploitation of item(s) of digital content as part of a package of digital content. These attributes may be modified by any additional Aggregator/Distributors in the digital content delivery chain in respect of contracts entered into further along the delivery chain. These must, of course, not in any way change existing attributes relating to royalty and fee allocations in upstream contracts. The attributes may not necessarily be registered with the IPR-DB until some time after this.

(7) Free area

15 This area is for the CIC to be used as required.

(8) System control information

20 These attributes are needed for system operations purposes and consists of digital signatures, digital watermarks, check digits, and content hash values and under certain circumstances may also contain metadata updates. These attributes are employed by the system operators and are not disclosed to other distribution chain players.

4.5.1 Registration of Metadata attributes

25 The cIDf Specification does not define regulations and protocols by which each player must register attributes for each metadata set listed above. However, Appendix B shows examples of the different process flows by which players might register metadata attributes for several different digital content distribution models.

30 Digital distribution transaction systems are extremely complex, and, as a consequence, it would be impossible to describe all of them in a single document. Furthermore, these systems are evolving from day to day. The digital content distribution system models shown in this Specification are given merely as examples. The authors of the Specification do not intend that the use of the Specification in digital content distribution should restrict the
35 development of or in any way prescribe the limits of the business of digital content distribution. The Specification

provides a basis by which the players involved in digital content distribution can develop dynamic digital content distribution businesses.

5 Therefore any implementation of the cIDf Specification, so long as it falls within the defined scope of the Specification, may be freely customized for application in specific digital content distribution systems. Furthermore, it is intended that the Specifications should be amended to reflect future developments in digital content distribution mechanisms and processes.

4.5.2 *Formats for the Content ID Center Management Number*

The following two formats are defined for the Content ID Center Management Number.

10

(a) **Binary format:** this is used when embedding watermarks.

(b) **Text format:** The binary format (1) is expressed as a hexadecimal ASCII, with a “/” (slash) being inserted between the “Content ID Center Management Number” and CIC Internal Management Number (the syntax for which is not fixed but may include the Content ID (Digital Item ID)). It is expressed in the XML description within the DCD. It is strongly recommended that this format should be used whenever storing the CIDCMN in the IPR-DB or during data processing exchanges, to avoid confusion.

15

The syntax of the CIDCMN is as follows:

20

00A0/0000AAAAFFFF

Where,

Version code = 0, Type code = 0, Goup code = 0, Content ID Center Number = A0,
CIC Internal Management Number. 0000AAAAFFFF (48 bits)

25

For the purposes of Resolution (see Chapter 5), this text format shall be used to express the Content ID Center Management Number, and, when required, shall be preceded by a specified protocol name and/or name space (NS). Two examples are given below:

hdl:1735.00A0/0000AAAAFFFF

Where, HDL signifies the CNRI Handle™ protocol, and the Namespace (NS) is 1735.

30

Urn:mpeg:mpeg21:diid:cid:1735.00A0%2F0000AAAAFFFF

Where,URN:MPEG:MPEG21 signifies the MPEG-21 resolution switch DID (ref. ISO 21000-3). When this notation with a slash “/” is unavailable for any reason attributed to grammatical rule, it could be written with “%2F” instead as mentioned above.

35

Furthermore, when representing the CIDCMN in printed form, the text format shall be preceded by “CID:” or “cid:” to avoid confusion when being read by humans and in written applications as follows:

(Ex.) [CID:00A0/0000AAAAFFFF](#)

5

4.5.3 *cIDf Data Exchange*

The attributes defined in Section 4.5.4 form part of the interface protocol for accessing the IPR-DB. They are not part of the internal structure or format of the IPR-DB where the attributes are stored. This approach is described in more detail in Appendix C. The interface protocol uses XML to describe the data transactions.

10 4.5.4 *Format for date and time*

Date and time is expressed using one of the following formats, from ISO8601.

Complete date plus hours, minutes and seconds with Time Zone Determinant:

YYYY-MM-DDThh:mm:ssTZD (eg 1997-07-16T19:20:30+01:00)

15

Complete date:

YYYY-MM-DD (eg 1997-07-16)

Complete year:

YYYY (eg 1997)

20 Unknown attribute segments may be set using an “*” (asterisk). (eg 1997-07-**).

4.5.5 *Provisional specification for player metadata attributes*

This is a provisional specification of these requirements. Attributes (such as name and contact information) related to creators, Copyright Owners, and the other players involved in digital content distribution are described in Appendix D, with reference to vCard (RFC2426).

Table 4.1: Metadata attributes of cIDf

Name	Description
Content ID Center Management Number	A unique identifier associated with a package of digital content
Version Code	A number identifying the current version of Content ID Center Management Number
Type Code	A number identifying the type of Content ID Center Management Number for each version code
Group Code	A number identifying the location of the Content ID Center
CIC Number	A number identifying the Content ID Center
CIC Internal Management Number	A number identifying digital content which are contained within the package of digital content identified by the CIDCMN
Digital content attributes	Digital content description
Creator attributes	Name of creator, personal history, etc.
Creation attributes	Attributes such as date and place of creation
Digital Content title	Digital content title and title keywords
Digital Content class	Digital content attributes such as encoding system, file size, genre (e.g. country and western music, horror film) etc.
Original-work attributes	Attributes identifying the copyright work (item of digital content) from which the existing item of digital content is derived (if appropriate)
Other unique identifier	Other unique identifiers associated with the item of digital content e.g. ISBN for a book or ISRC for a sound-recording
Supplementary notes	
Rights Ownership attributes	Attributes identifying the Rights Owner(s) of the item(s) of digital content contained in packages of digital content
Rights Administrator attributes	Attributes identifying the authorized Rights Administrator for the Rights Owner
Rights Assertion Attributes	Publishing rights, translation rights, duplication rights, reproduction rights, performing rights, moral rights etc.
Rights Owner Attributes	Attributes identifying the Rights Owner of the right(s) in the item(s) of digital content
Supplementary notes	
Rights Contracts attributes	Attributes describing the terms and conditions of a rights related contracts in respect of items and packages of digital content between any of the various players in the digital content distribution chain
Licence to Exploit Rights	Licence number, type of right granted, identification of licensee
Appointment of Rights Administrator	Contract Number, type of rights to be administered, territory of administration
Assignment of Rights	Location of content storage point, type of assignment, name of assignee
Distribution attributes	Attributes describing the manner in which a package of digital content may be exploited
Usage rule	Usage rules that the Consumer must observe
Distribution information	Attributes related to the distribution of the package of digital content such as the date of first sale, territory of exploitation etc.
Royalties and fees Allocation	Attributes which identify the players to whom royalties and other fees (or other "value") should be forwarded and the share of such royalties or fees each player should receive.
Free area	
System control	Attributes used by the system (Content ID Center, terminal equipment, software, last update)
Digital signature	Information validating the identity of the issuer of the DCD, usually the CIC
Digital watermark	Attributes identifying the digital watermark technology used to embed metadata in the package of digital content
Check digits	Codes enabling the validation of a Content ID Center Management Number

	Hash value	Codes enabling the identification of the carrying out of illegal acts in respect of the package of digital content or its DCD
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4.6 Detailed Metadata Attributes for the cIDf Specification

cIDf metadata consists of the metadata items listed in Table 4.1 and 4.3.

Each implementation of the cIDf Specification need not necessarily include all of these attributes, and a particular implementation is also not prohibited from including attributes additional to those listed here. However, the more implementations use common metadata sets for digital content distribution, the more this will encourage the promotion and development of new services. The attributes described in this section could offer an effective common interface, enabling interoperable digital content distribution systems.

4.6.1 Interface control information

The following attributes are used as control metadata in the exchange of metadata within the cIDf framework.

(1) **Root tag:** The following fixed value is used: <cidfMain>

(2) **Profile Number:** This identifies the implementation version of the cIDf Specification being used. The default or omission of a number or the number = “00” in HEX identifies the metadata sets in the cIDf specification. Further details are shown in Appendix K. The profile number will enable the development of bespoke implementations of the cIDf Specification to suit the requirements of each market sector, and will also enable the use of metadata schemas specified by other standardization bodies, within the cIDf framework.

(3) **Version Number in profile:** This identifies the version of each Profile Number. Further details are shown in Appendix K.

4.6.2 Content ID Center Management Number

The Content ID Center Management Number consists of a version number, a type number, a group number, a CIC number, and a CIC Internal Management Number. When the CIDCMN is embedded into the digital content in a watermark the number of bits that it uses may be restricted to increase the strength of digital watermark.

(1) Version Number

The “Version Number” is an attribute reserved for future use by cIDf and will be used to identify the version type of the cIDf binary expression being used. It described in 3 bits code. The bit length of Type Number, Group Number, CIC Number and CIC Internal Management Number is identified by the Version Number value.

It is important that existing identification standards can be used for digital content distribution in the context of the cIDf Specification. This can be accommodated by the use of different values for the Version Number.

(2) Type Number

The “Type Number” is an attribute reserved for future use by cIDf and will be used to identify the type of the Content ID for each version. It is described in 1 bit code. The Version Number 0 allows two values; ‘0’ and ‘1’.

5 *‘0’ indicates*

 A Group Number of 4 bits

 A CIC Number of 8 bits

 A CIC Internal Management Number of multiples of 4 bits (for which no syntax has been specified by cIDf)

10 *‘1’ indicates*

 A Group Number of 4 bits

 A CIC Number of 8 bits

 A CIC Internal Management Number of multiples of 4 bits for which the following sub-fields have been specified by cIDf:

15 Content Identification Standard value: 8 bits

 Identification Standard Identifier Length: indicates the length of the identifier as specified in the relevant identification standard

 Identifier value: of unspecified length

20 The use of the value ‘1’ supports the use of other international standard identifiers, proprietary identifiers or other cIDf identifiers.

(3) Group Number

25 The “Group Number” is assigned to groups in which the CICs are located based on certain conditions like country, region, market, and application by the Top Registration Authority (RA, see Chapter 6). Its length is established for each Version Number to be described.

(4) CIC Number

30 The “CIC Number” is issued by the RA together with a Group Number. It is a number of fixed length that identifies the CIC uniquely, and is defined for each Version Number to be described above.

(5) CIC Internal Management Number

35 The CIC Internal Management Number is assigned by the CIC. As this identifier will be used to identify digital content on a similar scale to that required by existing content numbering systems, it is considered that 40 bits will be needed; the same as an International Standard Recording Code, a common magazine code, and a Japanese Article Number.

There are several approaches that could be used by CICs to the syntax of the CIC Internal Management Number. These are set out below:

- 5 □ The use of area codes in much the same way as patent numbers within the syntax
 - Include other content identification standards within the syntax
 - Concatenate the CIC Internal Management Number from the Content ID (Digital Item ID) number(s) identifying the item(s) of digital content which are included in a package of digital content and a number which identifies the package of digital content itself.
- 10 The field and sub-field sizes of the CIC Internal Management Number can be determined according to the value of the Group Number, the Version Number and The Type Number. Therefore each implementation of the cIDf Specification is able to specify the field and sub-field length of the CIC Internal Management Number according to the mutual requirements of the parties planning to use the implementation.
- 15 As other identifiers may already have been assigned to an item of digital content which is registered with a CIC, the cIDf Specification allows that identifier to be set as the value for the Content ID (Digital Item ID) identifier. However, cIDf believes that the effective use of such other identification standards for digital content distribution can be more efficient when such identifiers are included within the Content ID Center Management Number embedded in the form of a watermark in the package of digital content.
- 20 The Content Identification Standards that can be included as values within the CIDCMN (as defined in the cIDf Specification) are identified in Appendix E. It will be necessary for the allocation and management of these values to be undertaken through the Registration Authority. As the length of the CIC Internal Management Number is not fixed by the cIDf Specification, neither can the length of the Content ID Center Management Number be fixed.
- 25 Therefore when the Content ID Center Management Number is embedded in a digital watermark it is necessary to specify the length of the CIDCMN being used. Appendix F shows guideline.

4.6.3 *Digital Content Attributes*

These attributes describe the items and packages of digital content and can be codified at the time the digital content is created.

30 **(1) Creator attributes**

The “Creator attributes” identify the person who created each individual item of digital content. The attributes are shown below; more than one value for each attribute may be registered through the CIC.

Creator ID

A “creator number”, uniquely identifying the Creator.

35 *The design for this identifier has been specified in Section 4.5.5 and Appendix D.*

Creator name

The creator's full name in text format.

This can be expressed using other existing or future metadata standards.

Alias

5 Any alternative names or pseudonyms that may be used by the Creator.

This can be expressed using other existing or future metadata standards.

Affiliate organization

The name of any organizations to which the creator may be affiliated.

This can be expressed using other existing or future metadata standards.

10 Date of Birth

The year, month, and day of the Creator's birth.

This can be expressed using other existing or future metadata standards.

Date of Death

The year, month, and day of the Creator's death.

15 *This can be expressed using other existing or future metadata standards.*

Links

Links the Creator may have with other Creators or players; to be used for creator searches. For example, Paul McCartney would be linked to The Beatles and to Wings.

This can be expressed using other existing or future metadata standards.

20 Contact information

This expresses contact information for the Creator. Specifically, this may include a telephone number, a fax number, an e-mail address, etc but should provide at least one method by which the Creator may be contacted.

This can be expressed using other existing or future metadata standards.

25 **(2) Digital Content Attributes**

Creation date

The date on which the digital content was created

This can be expressed using other existing or future metadata standards.

Creation location

30 The location where the digital content was created.

This can be expressed using other existing or future metadata standards.

Title

A name given to the digital content. Any subtitles or additional titles may be provided in the "Annotations" below.

35 Abstract

An outline of the digital content.

Keywords

Key words to facilitate the discovery of digital content, through structured searches.

This can be expressed using other existing or future metadata standards.

Language

5 The language used in the digital content (where relevant). Values identifying more than one language may be used. The language is identified through the standard ISO 639-1 code. In addition the country number using RFC1766 is added. For example, a value for language might be “en-US, ja-JP” (*en: English, ja: Japanese*)

Annotations

10 May be used by the creator to provide any information related to the item of digital content not included elsewhere.

Type

15 This expresses the type of media that make up the digital content, drawn from the following menu of media types: *audio, musical, visual, audiovisual, multimedia, movie, database, software, lexical, pictorial, narrative, text, document, art, other*

Genre

20 This expresses genre classifications for the digital content. This attribute is divided into the namespace of the Genre Identifier applied other relevant identification standards, and then the Genre Value; thus the plural Genre Value can be selected from terms defined by each Genre Identifier. For example, if the digital content is audiovisual, the Genre Identifier is classified by the identification standard of the ARIB/TV Anytime Forum; if it's music, it's classified by MPEG Audio Tag MP3; and if it's text, it's classified by text classification codes. There are further details in Appendix G.

Encoding

25 This expresses the format that the digital content is stored in. The Encoding types are shown in Appendix H.

Size

30 This expresses such measures as the digital content file size (in bytes, bits, Mbytes, etc.), or the number of units of the item of digital content. The total file size for the digital content before the inclusion of the CIDCMN is indicated in bite units: for example, 1234567 bytes. In future versions of the cIDf Specification it is intended that this attribute should also be used to express values such as, for example, the total file size following embedding of the CIDCMN through either a watermark or within the DCD or the number of pages contained in the digital content. In this version of the specification such metadata is expressed within the “Annotations” attribute.

35 Version

This attribute allows the creator to identify that the digital content is an updated version, for example a new edition of a text. This can be described freely.

Annotations

This attribute has been provisionally designed to allow free descriptions of attributes relating to content quality, for example, the sampling rate of an item of music.

This can be expressed using other existing or future metadata standards.

(3) Derivative Content Attributes

“Original” digital content item attributes

Multiple values can be expressed using the attributes below.

“Original” Content ID (Digital Item ID)

The Content ID (Digital Item ID) identifying the item of digital content that has been edited to create the current item of digital content.

Pre-edit digital content item attributes Multiple values can be expressed using the attributes set out below.

Pre-edit Content ID (Digital Item ID)

The Content ID(Digital Item ID) identifying the item of digital content from which the current item of digital content is immediately derived (this may be an “Original” item of digital content or a Derivative of an Original item of digital content – the current item of digital content may be a derivative of a derivative item of digital content).

Edited digital content

The attributes of the current (derivative) item of digital content. In Japanese Law this is defined as something which, through “editing” creates a clearly delineated work which results in either an “Edited work (Section 2, Paragraph 12)” or a “Secondary Publication (Section 1, Paragraph 2.12)”.

Edited work: any work that allows for creativity based on selection or arrangement of its elements (in some cases, the elements themselves are not published works). Examples are newspapers, magazines, dictionaries, almanacs, etc.

Secondary Publications: Published works based on other published works that have been translated, adapted, modified, made into a script or movie, or otherwise adapted from the original. (The original is a published work).

Terms such as Original, Compilation (two or more items of digital content), Extract, Replica, Translation, or Reference can be used as attribute values to describe edited items of digital content. When required, any relationships between these attributes may be freely described within this attribute.

(4) Other Identification Standards

CIDf is designed to be capable of incorporating other identification standards; this attribute therefore provides a way of expressing a link to other identification standards, for example, ISAN, ISBN, DOI, thus facilitating interoperability between different identifiers.

5 Multiple values are possible for this attribute, as it includes a value identifying the namespace of the relevant identification standard followed by the actual identifier in the format defined by that identification standard. As an example, this might be expressed as <OTHERCODE type=ISAN>1234 1234 1234 X</OTHERCODE> for an ISAN number. The identifier standards that can be included as values within the CIDCMN as defined in the cIDf Specification are shown in Appendix E. It would be preferable for the registration and management of the values
10 assigned for these identification standard to be administered by a Registration Authority or other similar institution.

(5) Annotations

This attribute allows free description of attributes relating to the digital content other than that set out above.

4.6.4 Rights Ownership Attributes

15 Rights Ownership Attributes, Rights Contracts Attributes and Distribution Attributes to be described will express articles of entitlements whether stated or implied to digital contents. The correspondence of these attributes to contracts is illustrated with examples in appendix J.

(1) Rights Administrator Attributes

20 These attributes identify the Rights Administrator appointed by the Rights Owner. The attributes below enable the identification of a single Rights Administrator, although it is possible to register two or more Rights Administrators.

Rights Administrator's ID

25 A number which uniquely identifies the authorized Rights Administrator of the Rights Owner. The process for registration of player Ids and the associated metadata is set out in the Appendix B.

Name of Rights Administrator

30 The name of the authorized Rights Administrator of the Rights Owner, in text form. The process for registration of player Ids and their associated metadata is set out in the Appendix B.

Contact Information

35 Contact information for the Rights Administrator of the Rights Owner; should include a telephone number, a facsimile number, or an email address or some means of contacting the agent. The process for registration of player Ids and the associated metadata is set out in the Appendix B.

(2) Rights Ownership Attributes

The Creator's rights attributes indicate each type of the author's economic rights related to reproduction, communication to the public and derivative works, etc. The attributes below enable the identification of a single Rights Owner, although it is possible to register two or more Rights Owners.

5

Types of rights

Indicates the type of specific rights such as Right of Reproduction, Right of Public Transmission, Right of Performance, etc. One or more is selected from among the following rights types. They are found in Copyright and other Intellectual Property Law or by custom and practice in rights contracts. Some rights types do not apply to all types of digital content.

Right of Reproduction

Right of Performance

Right of (Cinematographic) Presentation

Rights of Public Transmission

Right of Recitation

Right of Exhibition

Rights of Distribution

Rights of Transfer of Ownership

Right of Lending

Rights of Translation, Adaptation

Right of the Original Author in the Exploitation of a Derivative Work

Rights to Compensation for Private Recording

Right to Privacy

Right of Publicity

Right to Make Products Featuring a Popular Character

Right of Merchandising

Others

15

20

25

These values will need to be changed as changes occur in Copyright and other Intellectual Property Law or in custom and practice in rights contracts.

30

Rights Owners Ids

The unique identifier(s) of the Rights Owner(s) of the selected rights. The process for registration of player Ids and the associated metadata is set out in Appendix B.

Names of Rights Owners

35

The name(s) of the Rights Owner(s) of the selected rights. The process for registration of player Ids and the associated metadata is set out in Appendix B.

Contact point

Contact information for the Rights Owner(s) of each of the rights specified above. This should include a telephone number, facsimile number, or E-mail address or some other means of making contact with the Rights Owner(s). The process for registration of player
5 Ids and the associated metadata is set out in Appendix B.

(3) Neighboring rights attributes

In the territories where neighboring rights exist, these attributes describe each type of neighboring right. The attributes below enable the identification of a single neighboring right although it is possible to register two or more neighboring rights.

10 Types of rights

This describes the types of neighboring right being asserted. One or more of the values below may be used. These terms are found either in Copyright or other Intellectual Property Law or are used by custom and practice in rights contracts Some of these terms may not apply to all types of digital content.

15 *Right of Reproduction*

Right of Making Sound or Visual Recordings

Right of (Re-) Broadcasting

Right of Wire Diffusion

Right of Making Transmittable

20 *Right of Transfer of Ownership*

Right of Lending

Right to Compensation for Private Recording

Right to Secondary Use Fees of Commercial Phonograms

Right to Remuneration for Lending Commercial Phonograms

25 *Right of Communication (of Television Broadcasts)*

Right of Communication (of Wire Diffusions)

Others

30 These values may need to be changed as changes occur in Copyright and other Intellectual Property Law or custom and practice in rights contracts.

Rights owners Ids

The unique identifier(s) of the Rights Owner(s) of the selected rights. The process for registration of player Ids and the associated metadata is set out in Appendix B.

Names of Rights owners

35 The name(s) of the Rights Owner(s) of the selected rights. The process for registration of player Ids and the associated metadata is set out in Appendix B.

Contact point

Contact information for the Rights Owner(s) of each of the rights specified above. This should include a telephone number, facsimile number, or E-mail address or some other means of making contact with the Rights Owner(s). The process for registration of player
5 Ids and the associated metadata is set out in Appendix B.

(4) Moral Rights of Creators Attributes

The “Moral rights of creators” attributes describe the details of each type of moral right. The attributes below enable the identification of a single moral right, although it is possible to register two or more moral rights. “Rights owners Ids” and “Names of rights owners” are expressed in the same way as “Creator information” in the
10 “Content attributes”.

Types of rights

This describes the types of neighboring right being asserted, selected from the right to control “divulgence”, the right to control “the indication of creatorship” and the right to control “modification”. The exact nature and description of these rights (where indeed they
15 exist) will vary from one legal jurisdiction to another. One or more of the values below may be used. These terms are found either in Copyright or other Intellectual Property Law or are used by custom and practice in rights contracts. Some of these terms may not apply to all types of digital content.

Right of Making the Work Public

Right of Determining the Indication of the Creator’s Name

Right of Preserving the Integrity

Others

25 These values will need to be changed as changes occur in Copyright and other Intellectual Property Law or in custom and practice in rights contracts.

Assertion of moral rights

This identifies whether the creator is or is not asserting his moral rights (where this provision exists in local right law).

Assertion method

30 This identifies, in free form text, the method by which the moral rights of creators are asserted.

(5) Country of Registration of Rights

This identifies the country in which the Work (in the form of an item of digital content) was originally registered
35 and uses the format of ISO 3166. Registration of Works for the purposes of rights protection does not exist in all territories.

(6) Notes

This attribute may be used to describe any value relating to Rights Ownership of an item of digital content which is not provided for above.

4.6.5 *Rights Contracts Attributes*

5 These attributes describe the terms and conditions in contracts between players in respect of digital content distribution. Amongst the types of contracts that need to be described are the appointment of an agent for the administration of rights and the assignment of rights. Different types of right transactions are described in the next three sections with general “Rights Conditions Attributes” being described in the fourth section. These attributes can be applied to each of the previous three transaction types to enable detailed description of the relevant contract terms and conditions.

10 Rights Ownership Attributes, Rights Contracts Attributes and Distribution Attributes to be described will express articles of entitlements, whether stated or implied, to digital contents. The correspondence of these attributes to contracts is illustrated with examples in appendix J.

(1) License to exploit rights

15 The attributes below enable the identification of a single license to exploit rights although it is possible to register two or more such licenses.

License storage point

This identifies the location at which the license contract is stored.

License number

20 This is the number that uniquely identifies the license contract. One way of creating such a number might be to add a serial number to the Rights Owner’s User ID and the Aggregator/Distributor’s User ID. If a License Identification standard is developed in the future, it is intended that this will be used. However, for this version of the Specification, this attribute is expressed as an alphanumeric string.

Type of permission

25 This identifies the nature of the rights granted by the Rights Owner identified in the Rights Owner attributes.

Table 4. Type of right granted

30 This identifies the types of copyrights or neighboring rights that may be granted by a license from the Rights Owner some of which are listed below. One or more of the types of rights listed below may be selected. These are described in Copyright or other Intellectual Property Law or are used by custom and practice in rights transaction contracts. Some of the types of rights do not apply to all types of digital content.

Right of Reproduction

Right of Performance

35 *Right of (Cinematographic) Presentation*

Rights of Public Transmission

Right of Recitation

Right of Exhibition

Rights of Distribution

5 *Rights of Transfer of Ownership*

Right of Lending

Rights of Translation, Adaptation

Right of the Original Author in the Exploitation of a Derivative Work

Right of Making Sound or Visual Recordings

10 *Right of (Re-) Broadcasting*

Right of Wire Diffusion

Right of Making Transmittable

Right to Compensation for Private Recording

Right to Secondary Use Fees of Commercial Phonograms

15 *Right to Remuneration for Lending Commercial Phonograms*

Right of Communication (of Television Broadcasts)

Right of Communication (of Wire Diffusions)

Right to Privacy

Right of Publicity

20 *Right to Make Products Featuring a Popular Character*

Right of Merchandising

Other

This list of rights values may need to be amended as changes occur in Copyright or Intellectual Property Law or in custom and practice in rights transaction contracts.

25 2) Aggregator/Distributor (Licensee) User ID

This identifies the unique identifier of the organization or person (Aggregator/Distributor) to whom the license has been granted by the Rights Owner. The process for registration of player Ids and the associated metadata is set out in the Section 4.5.5 and Appendix D

3) Name of Aggregator/Distributor (Licensee)

30 This describes the name of the organization or person (Aggregator/Distributor) to whom the license has been granted by the Rights Owner. The process for registration of player Ids and the associated metadata is set out in the Section 4.5.5. and Appendix D.

4) Copyright Notices

35 This describes the general copyright notices that attach to any grant of rights. These will include such items as a rights reservation notice (which defines any exploitation outside the license terms as illegal) and the identity of the Creator of the digital content. The detailed and

specific terms and conditions of a license are described below in the Rights Conditions Attributes.

5) Transferability

This identifies whether or not the Aggregator/Distributor may sub-license the digital content to a third party.

6) Exploitation Territory of License

This identifies the country or region in which the digital content that is the subject of the license may be exploited, as granted by the Rights Owner. In the case of Internet exploitation, this would need to be “the world”. Two or more countries or regions may be included within the attribute value.

7) Period of Usage

This identifies the period during which the permission(s) granted by the license applies. The attributes express the “license start date” and “license end date” using the standard method of tabulating date and time.

8) Notes

Any attributes not listed above relating to the license terms may be freely expressed here.

(2) Appointment of Rights Administrator

Administration contract storage point

This identifies the location at which the administration contract is stored.

Administration contract number

This identifies the administration contract number that uniquely identifies the administration contract. One way of creating such a number might be to add a serial number to the Rights Owner’s User ID and the Rights Administrator’s User ID. If an Administration Contract Identification standard is developed in the future, it is intended that this will be used. However, for this version of the Specification, this attribute is expressed as an alphanumeric string.

Type of Administration

This attribute describes the nature of the rights of administration delegated by the Rights Owner identified in the Rights Owner attributes.

8) Type of rights to be Administered

This identifies the types of copyright(s), neighboring rights or moral rights that may be entrusted for administration by a Rights Owner some of which are listed below. One or more of the types of rights listed below may be selected. These are described in Copyright or Intellectual Property Law or are used as custom and practice in rights transaction contracts. Some of the types of rights do not apply to all types of digital content.

Right of Reproduction

Right of Performance

Right of (Cinematographic) Presentation

Rights of Public Transmission

Right of Recitation

Right of Exhibition

5 *Rights of Distribution*

Rights of Transfer of Ownership

Right of Lending

Rights of Translation, Adaptation

Right of the Original Author in the Exploitation of a Derivative Work

10 *Right of Making Sound or Visual Recordings*

Right of (Re-) Broadcasting

Right of Wire Diffusion

Right of Making Transmittable

Right to Compensation for Private Recording

15 *Right to Secondary Use Fees of Commercial Phonograms*

Right to Remuneration for Lending Commercial Phonograms

Right of Communication (of Television Broadcasts)

Right of Communication (of Wire Diffusions)

Right to Privacy

20 *Right of Publicity*

Right to Make Products Featuring a Popular Character

Right of Merchandising

Right of Making the Work Public

Right of Determining the Indication of the Creator's Name

25 *Right of Preserving the Integrity*

Others

This list of rights values may need to be changed as changes occur in Copyright or Intellectual Property Law or in custom and practice in rights transaction contracts.

30 2) Rights Administrator User ID

This uniquely identifies the organization or person (Rights Administrator) to whom the right of administration of rights has been granted by the Rights Owner. The process for registration of players' Ids and the associated metadata is set out in Section 4.5.5. and Appendix D.

3) Name of Rights Administrator

35 The name of the organization or person (Rights Administrator) to whom the right of administration of rights has been granted by the Rights Owner. The process for registration of

players' Ids and the associated metadata is set out in Section 4.5.5 and Appendix D.

4) Overview of rights of administration conditions

This briefly describes any limitations or conditions on the rights of administration granted to the Rights Administrator such as, for example, the requirements when entering into rights contracts to ensure that the Creator is accredited on the product or that the Creator or Rights Owner should be consulted before any rights contracts are entered into by the Rights Administrator.

5) Transferability

This identifies whether or not the Rights Administrator may appoint a third party to administer the digital content rights.

6) Rights Administration Territory

Defines the country or region in which the Rights Administrator will administer the rights entrusted to them by the Rights Owner. In the case of Internet exploitation, this would need to be "the world". Two or more countries or regions may be described in this attribute.

7) Period of Administration

Describes the period for which the right of administration of rights has been granted by the Rights Owner. The attribute expresses an "administration period start date" and an "administration period end date" using the standard method of tabulating date and time.

8) Notes

Any attributes not listed above related to the rights of administration of rights contract terms may be freely expressed here.

(3) Assignment of rights

Assignment contract storage point

This identifies the location at which the Assignment contract is stored.

Assignment Contract Number

This identifies the Assignment Contract Number that uniquely identifies an Assignment contract. One way of creating such a number might be to add a serial number to the Right Owner(1) (assignor)'s User ID and the Rights Owner(2) (assignee).s User ID. If an Assignment Contract Identification standard is developed in the future, it is intended that this will be used. However, for this version of the Specification this attribute is expressed as an alphanumeric string.

Type of assignment

This attribute describes the nature of the rights assigned by the Rights Owner(assignor) identified in the Rights Owner attributes.

1) Type of-rights assigned

This identifies the types of right that may be assigned by Rights Owners some of which are listed below.

Right of Reproduction

Right of Performance

Right of (Cinematographic) Presentation

Rights of Public Transmission

5

Right of Recitation

Right of Exhibition

Rights of Distribution

Rights of Transfer of Ownership

Right of Lending

10

Rights of Translation, Adaptation

Right of the Original Author in the Exploitation of a Derivative Work

Right of Making Sound or Visual Recordings

Right of (Re-) Broadcasting

Right of Wire Diffusion

15

Right of Making Transmittable

Right to Compensation for Private Recording

Right to Secondary Use Fees of Commercial Phonograms

Right to Remuneration for Lending Commercial Phonograms

Right of Communication (of Television Broadcasts)

20

Right of Communication (of Wire Diffusions)

Right to Privacy

Right of Publicity

Right to Make Products Featuring a Popular Character

Right of Merchandising

25

Right of Making the Work Public

Right of Determining the Indication of the Creator's Name

Right of Preserving the Integrity

Others

30

This list of rights values may need to be changed as changes occur in Copyright or Intellectual Property Law or in custom and practice in rights transaction contracts.

2) Rights Owner (2) (Assignee) User ID

This uniquely identifies the organization or person (Rights Owner (2) – assignee to whom the rights have been assigned by the Rights Owner(1) – assignor. The process for registration of players' Ids and the associated metadata is set out in Section 4.5.5. and Appendix D.

35

3) Name of Assignee

The name of the organization or person (Rights Owner(2) – assignee) to whom the rights have been assigned by Rights Owner(1) – assignor. The process for registration of players’ Ids and the associated metadata is set out in Section 4.5.5 and Appendix D.

5) Transferability

This identifies whether or not the Rights Owner(2) (assignee) may assign the rights to a third party.

6) Rights Assignment Territory

This defines the country or region for which the rights have been assigned by the Rights Owner(1) –(assignor). In the case of assignment for the Internet this would need to be “the world”. Two or more countries or regions may be described by this attribute.

7) Period of Assignment

This defines the period of assignment of rights by the Rights Owner(1) –(assignor). The attributes express “assignment start date” and “assignment end date” using the standard method of tabulating date and time.

8) Notes

Any attributes not listed above relating to the assignment of rights may be freely expressed here.

(4) Rights Conditions Attributes

Detailed attributes relating to contracts for Licenses, Administration of rights, and Assignment of rights between players are set out below. The more detailed expression of “Distribution attributes” may also use these terms.

Rights Conditions Attributes ultimately will be expressed in alternative form using controlled values assuming the need to improve the efficiency of digital content distribution. However, some free format fields are provided in this version of the Specification that may be used to include free text descriptions. A future task within CIDf will be to gain consensus on the individual attributes to be used as controlled values. This would not prevent different market sectors from providing market sector-specific value lists. However, it is anticipated that eventually a common set of values will be defined.

Contract number

This identifies the number of the contract on the license or administration or assignment of rights. If an international electronic contract identification standard is developed in the future, this will be used. At this edition of the Specification however, this element is written as alphanumeric characters.

Purpose of use

This describes in free format the purpose of use of the digital content in question, for example, as individual uses, for-profit business uses, non-profit-making business uses, educational uses, and broadcasting uses.

Type of usage

This attribute describes in free text format the type or types of usage to which the digital content may be put, for example: playing, streaming, cable broadcasting, radio broadcasting, downloading, conference or exhibition use, demonstration use, CD-ROM or DVD-ROM or print publication.

Digital Terminal and Environment Type

5 This describes in free format the technical environment and terminals for which the digital content may be used, for example: network, broadcasting, PDA or PC.

Expiration date

10 This indicates the time limit (absolute date and time) up to which the digital content can be used. The commencement date will usually be from the completion date of the contract provided that there are no other specific conditions to the contrary. This attribute must be in a standard form for defining date and time. An indefinite limit would be written as “9999-12-31”. If more than one expression of the expiry date or time exists then the latest date or time will take precedence.

Beginning of use (absolute time)

15 This describes the time (absolute time) at which the use of the digital content can begin. It must be written together with either “Use period” or “Use end (absolute time)” or “Accumulated use time”. This attribute must be in a standard form for defining date and time. If more than one expression of the beginning date or time exists then the earliest date or time will take precedence.

Termination of use (absolute time)

20 This indicates the time (absolute time) at which the use of the digital content terminates. It must be written together with either “Beginning of use (absolute time)” or “Beginning of use (relative time)”. The relevant digital content to which this applies can only be exploited when the difference between this data pair is a positive value. This attribute must be in a standard form for defining date and time. If more than one expression of the expiry date or time exists then the latest date or time will take precedence.

Beginning of use (relative time)

25 This describes the point (event) when the use of the digital content can begin. It must be written together with either “Use period” or “Termination of use (absolute time)” or “Accumulated use time”. The relevant digital content can only be used when the difference between this data pair is a positive value. If other set items concerning the beginning of use exist, the earliest time takes precedence. If more than one expression of the commencement date or time exists then the earliest date or time will take precedence.

Use period

30 This describes the period during which the digital content can be used whether or not it actually is used. It must be described together with either “Beginning of use (absolute time)” or “Beginning of use (relative time)”. The relevant digital content can only be used when the difference between this data pair is a positive value. The description must follow a method of expressing date and time such as the following:

[Complete dates] [plus hours, minutes and seconds]: [YYYY-MM-DD][Thh:mm:ss]

Example 10 years as 0010-00-00T00:00:00 or 0010-00-00
 1 week as 0000-00-07T00:00:00 or 0000-00-07
 8 hours as 0000-00-00T08:00:00 or T08:00:00

5 If more than one expression of the termination date or time exists then the latest date or time will take precedence.

Accumulated use measurement

10 This describes the accumulated amount of time or number of uses for which the digital content may be used. For example, a package of digital content may under the terms of a contract be played back 10 times or for a total of five hours in a period of a week. The attribute of date and time must be expressed using a method such as the following:

[Complete dates] [plus hours, minutes and seconds]: [YYYY-MM-DD][Thh:mm:ss]

Example 10 years as 0010-00-00T00:00:00 or 0010-00-00
 1 week as 0000-00-07T00:00:00 or 0000-00-07
15 8 hours as 0000-00-00T08:00:00 or T08:00:00

 If more than one expression of the termination date or time exists then the latest date will take precedence.

Editing method

20 This describes the conditions or limitations under which the content may be edited and/or combined with other content. The attribute is written in free format and might express for example, that Creator A does not wish to have his Works associated in packages of digital content with Creator B.

Area of sale

 This describes the locations where the digital content may be sold or bought.

25 This is written in free format, and, for example, might include such values as for homes, special shops, department stores, supermarkets, convenience stores, or be limited to certain cities.

Sales method

 This describes the manner by which the digital content is sold. This is written in free format, and, for example, might include such values as free, physical retail, online mall, online mail, or mail order.

Transmission method

30 This describes the type of communication method that can be used for delivery of the digital content. This is written in free format, and, for example, might include values such as terrestrial broadcasting, satellite broadcasting, cable broadcasting, CATV, mobile or Internet.

Viewer Classification

35 This identifies in free format the viewer classification that has been awarded to a package of digital content by the Rights Owner or the Aggregator/Distributor or by a Governmental Body. For instance, an "R" classification may have been given to a package of video content.

Media Storage Transfer

This describes whether and in what circumstances a package of digital content may be transferred to media other than the one in which it was received by the Consumer. This is expressed in free format using terminology such as “permitted in all circumstances”, “prohibited in all circumstances”, “permitted for transfer between media within the same household”.

Copying permissions

Defines whether copies of the package of digital content may be made and, if so, how many may be made. The values for this are expressed in free format and would include “any number of copies permitted” and “Limited number “n” copies permitted”. The value “0” would indicate that no copying is permitted.

Adaptation Permissions

This describes the ways in which adaptation of the package of digital content is permitted. The values for this attribute may include: “no adaptation permitted”, “any adaptation permitted”, “limited types of adaptation permitted” – such as combining the content with another item or package of digital content, digital content size change, color changes, speed of playback changes, or translation.

Requirement for Permission to Adapt

This flag identifies whether or not for the purposes of adaptation a direct request for permission to do so must be obtained from the original Creator in respect of his moral rights. The value for this flag is expressed by 0 for necessary or 1 for not necessary.

Requirement to display of release date

This describes whether the date of public release of the digital content must be displayed. The value for this flag is expressed by 0 for necessary or 1 for not necessary.

Requirement to display Creators names

This describes whether the names of the Creators must be displayed. The value for this flag is expressed by 0 for necessary or 1 for not necessary.

Digital Rights Management Technology (DRM)

This identifies the DRM technology or technologies that are to be used to store, transmit and render the digital content. This is expressed in free format, identifying whether or not a DRM is being used and, if so, specifying the name of the DRM technology in use.

Encryption

This identifies encryption technology or technologies that are to be used to encrypt the digital content. This is expressed in free format specifying the name of the encryption technology being used.

Watermarking

This identifies the watermarking technology that is being embedded in the digital content to carry metadata about the digital content. This is expressed in free format identifying whether or not a watermark is being used and, if so, specifying the name of the watermarking technology in use. The

attributes which define whether or not a meta-watermark is being used are also expressed here.

Playback control

This identifies the conditions that apply to the playback of the digital content. This is expressed in free format and could include permission for unlimited playback, a limitation that permits only partial playback or a limitation on the permitted number of playbacks. If this last value is used, it would apply even in circumstances where a time limitation existed.

Audio compression algorithm

This identifies the audio compression algorithm that is being used to compress the audio element of the digital content (if present). This is expressed in free format to identify compression formats such as Linear PCM, ATRAC, ATRAC 3, MP3, TwinVQ, and ACC.

Video compression algorithm

This identifies the video compression algorithm that is being used to compress the video element of the digital content (if present). This is expressed in free format to identify compression formats such as MPEG-1, MPEG-2, and MPEG-4, etc.

Audio sampling rate

This identifies the audio sampling rate being used for the audio element of the digital content (if present). This is expressed in free format and identifies sampling rates and their ranges.

Audio bit rate

This identifies the bit rate(s) being used for the audio element(s) of the digital content (if present). This is expressed in free format and identifies different bit rates and their ranges.

Video bit rate

This identifies the bit rate(s) being used for the video element(s) of the digital content (if present). This is expressed in free format and identifies different bit rates and their ranges.

Screen size

This identifies the screen size of any visual elements contained in the digital content when it is displayed. This is expressed in free format and identifies sizes (by width and height) and the levels of resolution (for example, "XGA").

Digital Storage Media

This identifies which digital storage media types the digital content is permitted to be rendered and initially stored on (provided that such storage is permitted) when it is received by the Consumer. This is expressed in free format and identifies such values as; rendering permitted on any media, or rendering permitted on specific media only such as ¹CD, MD, DVD, Smart Media, memory stick, PCMCIA card, micro drive, removable HD and fixed HD.

Copying Storage Media

This identifies the digital storage media on which further copies of the digital content (provided that additional copying beyond any initial copying or storage is permitted) may be made by the Consumer.

This is expressed in free format and identifies such values as: copying is permitted onto any media or copying is permitted on specific media only such as CD, MD, DCD, Smart Media, memory stick, PCMCIA card, micro drive, removable HD, and fixed HD.

Notes

5 This identifies in free text format any restrictions or permissions the attributes for which do not appear above and which are imposed by the terms and conditions of the relevant contract.

Additional Requirements

10 This describes in free format any further requirements imposed on the Rights Owner or Rights Administrator or Aggregator/Distributor by the Creator or Rights Owners (depending on the circumstances) with regard to the rights contract. For example, a requirement may be that the item of digital content is only exploited with another names item of digital content.

Prohibition conditions

15 This describes in free format any prohibitions imposed on the Rights Owner or Rights Administrator or Aggregator/Distributor by the Creator or Rights Owner (depending on the circumstances) with regard to the rights contract. For example, a Rights Owner may not permit the association of an item of digital content for the purposes of advertising certain products.

Exception conditions

20 This describes in free format any of the exceptions to the grant of rights stipulated by the Rights Owner or Rights Administrato or Aggregator/Distributor by the Creator or Rights Owner (depending on the circumstances) with regard to the rights contract.

4.6.6 *Distribution attributes*

Rights Ownership Attributes, Rights Contracts Attributes and Distribution Attributes to be described will express articles of entitlements, whether stated or implied, to digital contents. The correspondence of these attributes to contracts is illustrated with examples in appendix J.

25 **(1) Usage rules**

This metadata describes the rights and permissions that are granted to Consumers, as a consequence of up-stream contracts, by an Aggregator/Distributor. A considerable number of different values may be expressed in order to define extremely detailed usage rules. For example:

30 <Unit 1>
 Purpose of usage: personal use
 Term of usage: 0000-00-07 (one week)
 Copying permissions: 0

35 <Unit 2>

Purpose of usage: educational use

Term of usage: 0001-00-00 (one year)

Copying permissions: free

Requirement condition: number of copies must not exceed the number of students.

5 It is assumed that in future digital content distribution players, including Consumers, will be involved in digital content distribution as witnessed by existing “Peer to Peer” business models. Consequently, attributes describing the usage rules may apply equally to Aggregator/Distributors and Consumers alike.

The attributes set out in the Distribution Attributes section are required to conform with the upstream rights detailed in the “Rights conditions attributes” of the “Rights Contracts attributes”. In other words an
10 Aggregator/Distributor is unable to grant Distribution rights that have not been granted by an upstream Aggregator/Distributor or a Rights Owner.

The attributes for the usage rules are implemented in the DRM (Digital Rights Management). The assumption with regard to Distribution Attributes is that they are expressed as a controlled value list, thus improving
15 efficiency in digital content distribution. However, some free format fields are provided in this version of the Specification that may be used to include free text descriptions. A future task within cIDf will be to gain a consensus on the individual values. This would not prevent different market sectors from specifying market-sector-specific attribute lists. However, it is anticipated that eventually a common set of attribute values will be defined.

20

The attributes except for “Contract number” are generally the same as those described in the “Rights conditions attributes” of the “Rights Contracts attributes”

(2) Distribution Parameters

Date of Distribution

25 This identifies the date on which the digital content is distributed for exploitation. The values are expressed using the standard method of tabulating date and time.

Region

This identifies the country or region in which permission has been granted for the digital content to be distributed. It is possible to identify more than one country or region.

30

(3) Permissions

Superdistribution

This indicates whether or not the Consumer may re-distribute the digital content to other Consumers and on what basis such re-distribution may take place. This includes the P2P distribution model.

Transfer of rights

35

This indicates whether or not the Consumer may transfer any rights in the digital content to other Consumers and on what basis such transfer may take place. Such an activity would go well beyond

current P2P distribution models, or indeed any other current business practice. However, such a model may exist in the future.

4.6.7 *Royalty and Fee Allocation Attributes*

(1) Royalty and Fee Allocation Attributes

5

Royalty and Fee Shares

This expresses the ratio of royalties and fees generated from the exploitation of the digital content that will be paid to each of the players in the distribution chain.

Player User Ids

10

This identifies the User ID of each of the players entitled to any of the royalties or fees generated from the exploitation of the digital content. *This can be expressed using other existing or future metadata standards.*

Player Name

15

This identifies the name of each of the players entitled to any of royalties or fees generated from the exploitation of the digital content. *This can be expressed using other existing or future metadata standards.*

(2) Notes

This identifies in free format any attributes relating to the royalty and fee allocation that do not appear above.

4.6.8 *Free area*

20

This free area is managed by the CIC. It is free format and is aimed at offering opportunities for adding value to digital content distribution environments based on the cIDf Specification. It may also be used in specific implementations of the cIDf Specification for particular market sectors, to enable services to be introduced to meet particular market requirements.

25

For example, it might be used: to describe settings for access to digital content samples to preview data, for customer management data, for digital content sales history data, for settings for variations in digital content price lists dependent on elapsed time since original distribution, for the addition of data for enabling advanced services to identify unauthorized digital content usage and for links to metadata managed in locations other than the IPR-DB.

4.6.9 *System control attributes*

30

(1) Last attribute update

The "Last attribute" update field identifies the last date and time when any attribute values were updated. The values are expressed using the standard method of tabulating date and time.

(2) Digital signature

This identifies the presence or absence of a digital signature, and the digital signature technology being used. It also describes the signature format and signature value. This attribute is only applied in the context of the use of a DCD.

(3) Watermark

5 This identifies the watermarking technology embedded in the digital content. A meta-watermark value, which identifies one of the different watermarking technologies used in a cIDf Specification implementation, is assigned by the RA. The format uses two hexadecimal ASCII characters. The value '00' indicates that no real watermark is in use or that the watermark in use is unknown. This version of the Specification requires an 8 bits length for this field with the first two bits being an extension control the value of which is '00'. The "real" watermark
10 technology used will be determined by the type of media included in the digital content. In particular it is governed by the "Encoding" attribute value in the Digital Content Attributes. The following types are permitted:

- Application (computer program, document created with specific applications e.g. .pdf, .ppt, .doc)
- Audio (audio)
- 15 □ Image (still picture)
- Message (does not exist at present)
- Text (plain text)
- Video (moving picture, video, multimedia)
- X-world (does not exist at present)

20

(4) Check digit

This is a number that allows the Content ID Center Management Number to be validated or errors detected. In this version of the cIDf Specification the check digit is not defined. This attribute is a placeholder for such a definition at a later date.

25

(5) Digital Content Hash value

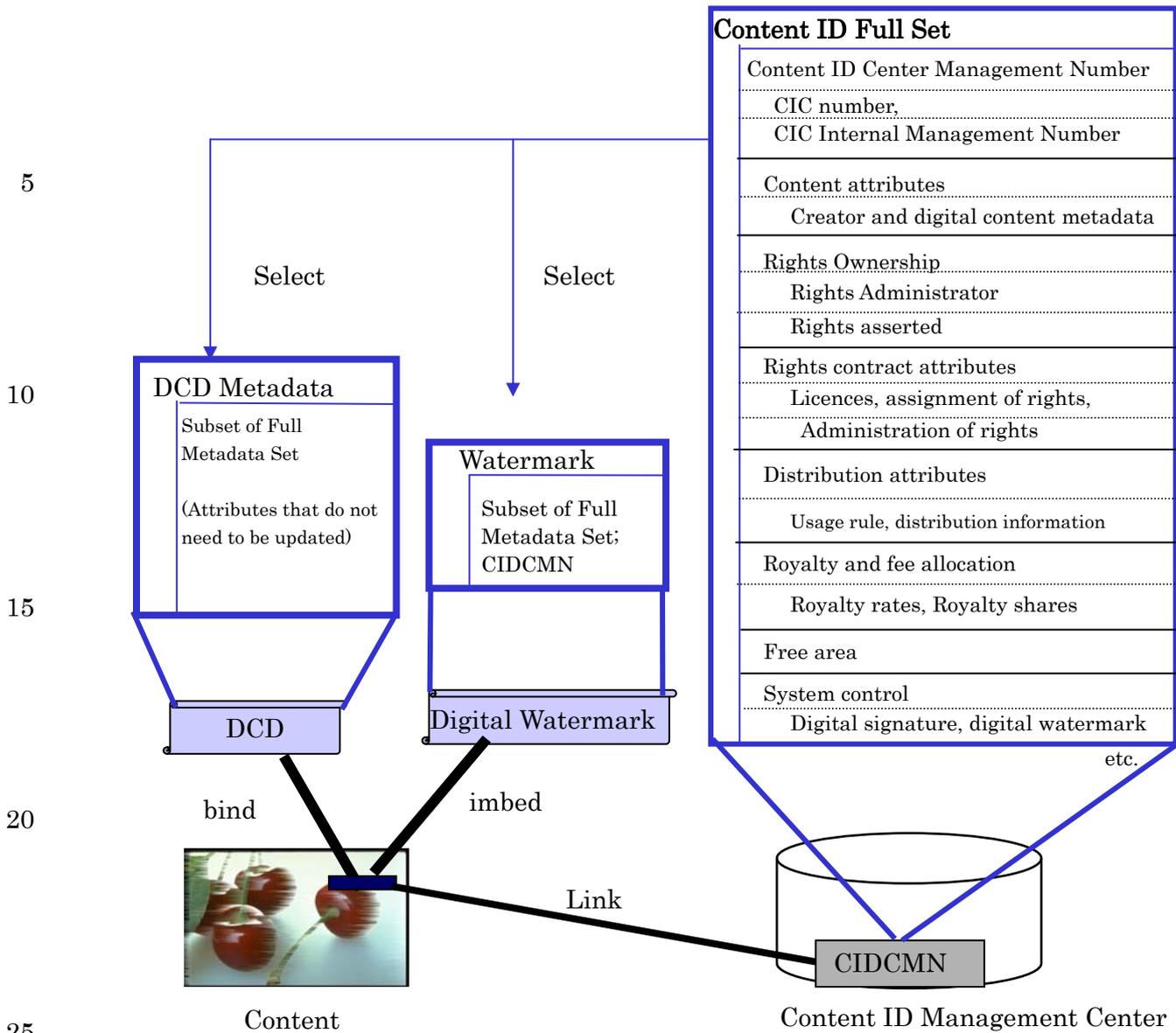
This identifies a relationship between the digital content and a value stored in the digital content metadata, which is calculated from the digital content data itself. This attribute identifies the Hash format and the Hash value.

30 4.7 Metadata Association

The diagram below shows the architecture for associating metadata with the digital content to which it relates. The full set of metadata attributes for a package of digital content will be held on an IPR-DB managed by a CIC. The methods for recording and storing metadata attributes will be the subject of further study.

35 The mechanisms which enable association of metadata with the digital content to which they relate are digital

5 watermarks and the Distributed Content Descriptor (DCD). The digital watermark includes the CIDCMN. This makes it possible to determine whether the distributed digital content is part of a cIDf Specification implementation which enables the establishment of the distribution path of the digital content. This in turn makes it possible to monitor for illegal use of the digital content. The DCD contains attributes relating to the digital content which are fixed (for example, the Creator name) and which therefore will (in theory at least) never need be updated in the full set of metadata held by the IPR-DB. The DCD is placed in the digital content header and distributed with the digital content. The DCD makes it possible to identify digital content attributes even when the digital content is outside a networked cIDf environment. This promotes efficient digital content distribution.



4.8 cIDf Metadata Expression

The various attributes within the cIDf Metadata set held in the IPR-DB are expressed in XML.

4.8.1 Essential Attributes

In this version of the Specification, the following attributes are considered essential:

- Content ID Center Management Number.
- Digital Content related attributes: "Creation date"
- Creator attributes: "Name"
- Content Attributes: "Title"

- Content Attributes: “Type”
- Rights Owner and/or Rights Administrator attributes: “Names of Rights Owner/Administrator”, “Contact point”

5 Given the stated objectives of digital content distribution targeted by cIDf, this version of the Specification highly recommends implementation of at least the following other attributes:

Rights Contract attributes and/or Distribution attributes: “Purpose of use”, “Type of usage”, “Digital terminal and environment type”, “Expiration date”, “Copy permissions”, “Adaption permission”, “Requirement for permission to adapt”, “Requirement to display Creators name”

10 Table 4.3 sets out this out in detail.

4.8.2 *Notation format*

cIDf attributes are expressed using XML as the interface between the IPR-DB and all other players. The format (tag name, maximum data length) is shown in Table 4.3. The maximum data length shown in this table identifies the maximum number of characters that can be used in the XML text, and not the number of characters in the actual attribute values themselves. This form of expression does not restrict the use of other methods of expression in the future. Future versions of the cIDf Specification may define the use of other standard expression methods (for example, XrML, XcML, or Binary XML). Similarly the methods of expression used within the IPR-DB are not restricted. In future, the XML schema will be published on the homepages of the Registration Authority or other cIDf public institutions.

20 4.8.3 *Data Transfer interface*

The data transfer interface enables the communication of metadata between application programs used by the various players in the digital content distribution chain and the IPR-DB, or between IPR-DBs. Normally, stored values are set to the responses for reference requests from application programs regarding attribute items installed in the IPR-DB, and requested values are stored in the IPR-DB for update requests from application programs regarding attribute items that are installed in the IPR-DB.

No values are set to the responses for reference requests from application programs regarding attribute items that are not installed in the IPR-DB, but this must not cause abnormal termination of the application programs nor the system. Similarly, update requests from application programs regarding attribute items that are not installed in the IPR-DB are ignored, but this must not cause abnormal termination of the application programs nor the system. Tag names that are not defined in these specifications can be defined in XML and applied based on mutual agreement between the systems conducting the communication.

Table 4-3 :The format of cidf attributes in IPR-DB (1/11)

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }
Level 1	Level 2	Level 3	Level 4				
Route tag				cidfMain	8	X	cidfMain
Interface control information	Profile information			InterfaceControl			
				MetadataProfile			
		Profile number		PfID	2		Hexadecimal ASCII
		Version number in profile		PfVersion	2		Hexadecimal ASCII
Content ID Center Management Number	Unique code(combined)			IDCenter		X	At least one is necessary between combined type and separated one.
				UniqueID	128	X	Hexadecimal ASCII. / is inserted between Center number and Intra-center number.
	Unique code(separated)			UniqueID1		X	separated type into each level 3 element
		VersionNumber+Type Number		Version	10	X	Hexadecimal ASCII
		Group Number		Region	10	X	Hexadecimal ASCII
		CIC Number		CenterNumber	17	X	Hexadecimal ASCII
		CIC Internal Management Number		IntraNumber	128	X	Hexadecimal ASCII
contents attributes	Creator information			Content			
				Creator			One or more instances
		Creator ID		CreatorID	64		Notation of players information
		Creator name		CreatorName	256	X	Notation of players information
		Popular name		PopularName	256		Notation of players information
		Affiliation		Affiliation	256		Notation of players information
		Date of birth		BirthDate	Extended-DATE		Notation of players information and extended ISO8601 { 2001-08-10[T17:05:10+09:00] }

Table 4-3 :The format of cidf attributes in IPR-DB (2/11)

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }	
Level 1	Level 2	Level 3	Level 4					
		Date of death		DeathDate	Extended-DATE		Notation of players information and extended ISO8601 { 2001-08-10[T17:05:10+09:00] }	
		Personal History		PersonalHistory	256		Notation of players information	
		Contact point		ContactPoint	512		Notation of players information	
	Creation information				Production			
		Date of creation		CreateDate	Extended-DATE	X	Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }	
		Place of creation		CreatePlace	256		Free text form	
	Outline overview				Overview			
		Title		Title	256	X	Free text form	
		Abstract		Abstract	1024		Free text form	
		Key words		Keywords	512		Free text form and One or more instances	
		Language		Language	20		ISO639-1, RFC1766 and Zero or more instances	
	Contents class				Notes	512		Free text form
					Class			
		Type		CType	64	X	Select one among: audio, musical, visual, audiovisual, multimedia, movie, database, software, lexical, pictorial, narrative, text, document, art, others	
		Genre	Genre Identifier		GnType	128		Select one among Genre types and notate with its code (code: optional): {<GN_TYPE code="VM">Visual.Music</GN_TYPE>}
			Genre value		GnDetails	256		Select one or more (up to 10) among Genre details and notate with primary/secondary and their codes (code: optional): { <GN_DATAILS type="primary"code="4.4.1">Music.Pop/rock/pop-rock.WorldMusic</GN_DATAILS> }
		Coding		Coding	32		Select one among Coding types.	
		Size		CSize	20		Free text form	
	Version		Version	256		Free text form		

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }	
Level 1	Level 2	Level 3	Level 4					
		Notes		NotesCt	512		Free text form	
	Original content information			OriginalWork				
		Roots-edited contents information	Root content CIDCMN	RootsWorkID	128		Hexadecimal ASCII. / is inserted between CIC number and CIC Internal Management Number.	
		Pre-edited contents information		PreeditedWork			Zero or more instances	
			Pre-edited content CIDCMN edit contents		PreeditedWorkID	128		Hexadecimal ASCII. / is inserted between CIC Number and the CIC Internal Management Number.
	Other identifier Systems			Edit	512		Free text form	
				OtherCode	256		Zero or more instances from Content Identifiers	
		Notes		Notes	512		Free text form	
Rights attributes				Copyright				
				RightsAgents			One or more instances	
		Rights Administrator information	Rights Administrator ID		RightsAgentID	64		Notation of players information
			Names of Rights Administrator		Name	256	X	Notation of players information
			Contact point		ContactPoint	512	X	Notation of players information
		Creator's rights information			DetailedRights			Zero or more instances
			Types of rights		Types	64		Select among Type of rights.
			Rights owners Ids		COwnerID	64		Notation of players information
			Names of rights owners		Owners	256		Notation of players information
			Contact point		ContactPoint	512		Notation of players information
		Neighboring rights information			NeighboringRights			Zero or more instances
			Types of rights		Types	64		Select among Type of rights.
			Rights owners IDs		NOwnerID	64		Notation of players information

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }
Level 1	Level 2	Level 3	Level 4				
		Names of rights owners		Owners	256		Notation of players information
		Contact point		ContactPoint	512		Notation of players information
	Moral rights of creators			MoralRights			Zero or more instances
		Types of rights		Types	64		Select among Type of rights.
		Assertion/non-assertion of rights		Exercise	1		Numerical (Exercise=1, Non-exercise=0)
		Assertion method		Exercises	512		Free text form
	Country of rights registration			CountryCode	2		ISO3166
	Notes			Notes			Free text form
Rights contracts attributes	Licence to exploit rights			RightsOperating			
				Permissions			Zero or more instances
		License storage point		PContractDeposit	512		Notation of players information
		License number		PContractNumber	256		Free text form
		Type of licence		PRightsKind			One or more instances
		Type of permission		RightsKind	64		Select among Type of rights and One or more instances
		Licensee ID		LicenseeID	64		Notation of players information
		Name of licensee		Licensee	256		(5/11) Notation of players information
		Type of right granted		Conditions	128		Free text form
		Copyright Notices		Repermission	1		Numerical (Accept=1, Refuse=0)
		Exploitation territory of licence		Region	256		Free text form and Zero or more instances
		Period of Usage(start)		TermStart		Extended-DATE	

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }	
Level 1	Level 2	Level 3	Level 4					
			Period of usage(end)	TermEnd	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }	
			Notes	RpNotes	512		Free text form	
	Administration of rights	Type of administration			EntrustingControl			Zero or more instances
			License storage point		EContractDeposit	512		Notation of players information
			License number		EContractNumber	256		Free text form
					ERightsKind			One or more instances
			Type of Administration		RightsKind	64		Select among Type of rights and One or more instances
			Licensee ID		EntrustmentPointID	64		Notation of players information
			Name of licensee		EntrustmentPoint	256		Notation of players information
			Overview of conditions		EConditions	128		Free text form
			Transferability		Reentrusting	1		Numerical (Accept=1, Refuse=0)
			Rights Administration territory		ERegion	256		Free text form and Zero or more instances (6/11)
			Period of Administration(Start)		TermStart	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Period of Administration(end)		TermEnd	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Notes		ReNotes	512		Free text form
	Assignment of rights				Transferring			Zero or more instances
		License storage point			TContractDeposit	512		Notation of players information
		License number			TContractNumber	256		Free text form
		Type of assignment			TRightsKind			One or more instances

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }
Level 1	Level 2	Level 3	Level 4				
			Type of transfer	RightsKind	64		Select among Type of rights and One or more instances
			Licensee ID	DestinationID	64		Notation of players information
			Name of licensee	Destination	128		Notation of players information
			Overview of transfer conditions	TConditions	128		Free text form
			Atransfer ability	Retransferring	1		Numerical (Accept=1, Refuse=0)
			Assignment Territory	Region	256		Free text form and Zero or more instances
			Assignment Term(start)	TermStart	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Assignment term(end)	TermEnd	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Notes	RtNotes	512		Free text form
	Rights conditions attributes			RightsOpConditions			One or more instances
			Contract number	ContractNumber	256		Free text form
			Purpose of use	RPurpose	256	X	Free text form and One or more instances
			Types of usage	RMethod	256	X	Free text form and One or more instances
			Digital terminal and environment type	RPermittedTarget	256	X	Free text form and One or more instances
			Expiration date	RValidTerm	Extended-DATE	X	Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Beginning of use (absolute time)	RAbsoluteStart	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Termination of use (absolute time)	RAbsoluteEnd	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }
Level 1	Level 2	Level 3	Level 4				
		Beginning of use(relative time)		RRelativeStart	256		Free text form
		Use period		RDuration	256		[YYYY-MM-DD][Thh:mm:ss],{One month: 0000-01-00 , One week: 0000-00-07 , 8 hours: T08:00:00 }
		Accumulated use time		RCumulativeTime	256		[YYYY-MM-DD][Thh:mm:ss],{One month: 0000-01-00 , One week: 0000-00-07 , 8 hours: T08:00:00}
		Editing method		RCompilation	256		Free text form and Zero or more instances
		Area of sale		RStores	256		Free text form and Zero or more instances
		Sales method		RSalesMethod	256		Free text form and Zero or more instances
		Transmission method		RTransmission	256		Free text form and Zero or more instances
		Viewer classification		RUsersRestriction	256		Free text form and Zero or more instances
		Media storage transfer		RMove	256		Free text form and Zero or more instances
		Copy permission		RCopyPermission	32	X	Free text form and One or more instances
		Adaption permission		RAltering	128	X	Free text form and One or more instances
		Requirement for permission to adapt		RContactRequired	1	X	Numerical (Necessary=1, Unnecessary=0) (8/11)
		Requirement to display release date		RDisplayRequired	1	X	Numerical (Necessary=1, Unnecessary=0)
		Requirement to display Creators name		RNameDisplayRequired	1	X	Numerical (Necessary=1, Unnecessary=0)
		DRM		RDRM	256		Free text form and Zero or more instances
		Encryption		RCipher	256		Free text form and Zero or more instances
		Qatermarking		RWatermark	256		Free text form and Zero or more instances
		Playback control		RPlayControl	256		Free text form and Zero or more instances
		Audio compression algorithm		RVoiceCompression	256		Free text form and Zero or more instances
		Video compression algorithm		RVideoCompression	256		Free text form and Zero or more instances

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }	
Level 1	Level 2	Level 3	Level 4					
		Audio sampling rate		RVoiceSamplingRate	256		Free text form and Zero or more instances	
		Audio bit rate		RVoiceBitRate	256		Free text form and Zero or more instances	
		Video bit rate		RVideoBitRate	256		Free text form and Zero or more instances	
		Screen size		RDisplaySize	256		Free text form and Zero or more instances	
		Digital storage media		RPrimaryStorageMedia	256		Free text form and Zero or more instances	
		Copying storage media		RSecondaryStorageMedia	256		Free text form and Zero or more instances	
		Notes		RNotes	512		Free text form	
		Additional requirements		RRequirements	512		Free text form	
		Prohibition conditions		RProhibition	512		Free text form	
		Exception condition		RExceptions	512		Free text form	
Distribution attributes				Distribution				
		Usage rules		UsageRule			One or more instances	
			Purpose of use		Purpose	256	X	Free text form and One or more instances
			Types of usage		Method	256	X	Free text form and One or more instances
			Digital terminal and environment type		PermittedTarget	256	X	Free text form and One or more instances
			Expiration date		ValidTerm	Extended-DATE	X	Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Beginning of use(absolute time)		AbsoluteStart	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Termination of use(absolute time)		AbsoluteEnd	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }
			Beginning of use(relative time)		RelativeStart	256		Free text form
			Use period		Duration	256		[YYYY-MM-DD][Thh:mm:ss],{One month: 0000-01-00 ,One week: 0000-00-07 , 8 hours: T08:00:00}

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }
Level 1	Level 2	Level 3	Level 4				
		Accumulated use time		CumulativeTime	256		[YYYY-MM-DD][Thh:mm:ss],{One month: 0000-01-00 ,One week: 0000-00-07 , 8 hours: T08:00:00}
		Editing method		Compilation	256		Free text form and Zero or more instances
		Area of sale		Stores	256		Free text form and Zero or more instances
		Sales method		SalesMethod	256		Free text form and Zero or more instances
		Transmission method		Transmission	256		Free text form and Zero or more instances
		Viewer classification		UsersRestriction	256		Free text form and Zero or more instances
		Media storage transfer		Move	256		Free text form and Zero or more instances
		Copying permissions		CopyPermission	32	X	Free text form and Zero or more instances
		Adaption permission		Altering	128	X	Free text form and Zero or more instances
		Requirement for permission to adapt		ContactRequired	1	X	Numerical (Necessary=1, Unnecessary=0)
		Requirement to display release date		DisplayRequired	1	X	Numerical (Necessary=1, Unnecessary=0) (10/11)
		Requirement to display Creators name		NameDisplayRequired	1	X	Numerical (Necessary=1, Unnecessary=0)
		DRM		DRM	256		Free text form and Zero or more instances
		Encryption		Cipher	256		Free text form and Zero or more instances
		Watermarking		Watermark	256		Free text form and Zero or more instances
		Playback control		PlayControl	256		Free text form and Zero or more instances
		Audio compression algorithm		VoiceCompression	256		Free text form and Zero or more instances
		Video compression algorithm		VideoCompression	256		Free text form and Zero or more instances
		Audio sampling rate		VoiceSamplingRate	256		Free text form and Zero or more instances
		Audio bit rate		VoiceBitRate	256		Free text form and Zero or more instances
		Video bit rate		VideoBitRate	256		Free text form and Zero or more instances
		Screen size		DisplaySize	256		Free text form and Zero or more instances

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }	
Level 1	Level 2	Level 3	Level 4					
		Digital storage media		PrimaryStorageMedia	256		Free text form and Zero or more instances	
		Copying storage media		SecondaryStorageMedia	256		Free text form and Zero or more instances	
		Notes		UNotes	512		Free text form	
		Additional requirements		UsageRequirements	512		Free text form	
		Prohibition conditions		UsageProhibition	512		Free text form	
		Exception condition		UsageExceptions	512		Free text form	
	Distribution information				DistributionInfo			
		Date put on sale		SellDate	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }	
		Region		Region	256		Free text form and Zero or more instances	
	Permissions				RedistributionInfo			(11/11)
		Super-distribution		URpermission	1		Numerical (Accept=1, Refuse=0)	
	Transfer of rights		URetransferring	1		Numerical (Accept=1, Refuse=0)		
Royalty and fee allocation attributes				Royalty			One or more instances	
	Royalty and Fee attributes	Royalty and fee shares		Rates	5.2		{ 100.00 }	
		Player Ids		DestinationID	64		Notation of players information	
		Player Names		Destinations	256		Notation of players information	
	Notes		RoyalNotes	512		Free text form		
Free area			FreeArea	2152		Free text form		
System control				SystemControl				
	Latest update		LastUpdate	Extended-DATE		Extended ISO8601 { 2001-08-10[T17:05:10+09:00] }		
	Digital signature				Signature	64	Valid in DCD (Distributed Content Descriptor) only	
		Signature method		SignatureMethod	2		Numerical (1,2,3**)	
		Signature values		SignatureValue	512		Hexadecimal ASCII	
Digital watermark		Watermark	64		Hexadecimal ASCII			

Table 4-3 :The format of cidf attributes in IPR-DB

Attribute Elements				Tag Name	Maximal Length in bytes	Mandatory	Notations { Examples }
Level 1	Level 2	Level 3	Level 4				
	Check digits			CheckDigit	30		Reserved
	Contents Hash values			Hash			
		Hash method		HashMethod	2		Numerical (1,2,3..)
		Hash values		HashValue	256		Hexadecimal ASCII

4.8.4 *Metadata within the DCD*

If the attributes contained within the DCD are in XML format, the tags defined above shall be used. Where a DCD is used security of the digital content is strengthened through the use of a digital signature.

5. *cIDf Registration Authorities and cIDf Identifier Resolution*

5.1 Introduction

In this chapter, the function and management of the cIDf Registration Authority will be described. Secondly, the specification for cIDf Resolution, which enables the resolution of identifiers to related resources, will be described. Typical examples of these “related resources” are locations which store metadata associated with the package of digital content. One of the locations would be the IPR-DB that manages metadata relating to digital content within the cIDf environment. This resolution system is based on the Handle™ System developed by the Corporation for National Research Initiatives (CNRI) in the U.S. Further information regarding the Handle System is provided in Appendix I (“Outline of the CNRI Handle System”).

5.2 Definition of Terms

Table 5-1 defines the terms used in the Handle System and in this Specification.

Table 5-1: Handle System Terms

Term	Abbreviation	Definition
Handle	-	An identifier associated with metadata describing a specific digital resource
Naming Authority	NA	The element of the Handle identifier prefix that indicates which Local Handle Service it is registered with. The NA identifier is issued by and registered with CNRI, which operates the Global Handle Registry. “1702” is used as the example of an NA identifier in this Specification.
Local Name	-	Unique value making up the identifier within the domain of a Naming Authority. The NA mandates the syntax of the suffix. In the case of cIDf, this is the CIC Internal Management Number.
Global Handle Registry	GHR	The authority that manages Handles globally via the Internet. LHS servers must be registered on the Global Handle Server. Currently, CNRI itself operates the GHR, but in the near future, a separate operating company may be established to fulfill this role.
Local Handle Service	LHS	A Handle management unit in the layer below the GHR. In cIDf identifier resolution, the LHS is operated by the cIDf’s RA.
Uniform Resource Name	URN	Identifier indicating a resource on the Internet. Example of notation: URN::=1702.120A/0102 ⁹ RFC1737 (http://www.ietf.org/rfc/rfc1737.txt)

5.3 The Relationship between the Registration Authority and the Content ID Management Center (CIC)

5.3.1 *Role and Operations of the Registration Authority*

It is anticipated in the cIDf Specification that there will be several CIC throughout the world (starting with dozens

⁹ The Handle NA (1702) is used here only as an example; cIDf plans to apply for a new Handle NA identifier.

in the immediate future; increasing to several hundred or several thousand in the future). The Registration Authority (RA) oversees all CIC. The RA issues a unique CIC Number to each CIC. In order to uniquely identify packages of digital content registered with each CIC, the CIC uses its CIC Number as a prefix to a CIC Internal Management Number (which is unique within each CIC) and which is itself associated with metadata attributes relating to the package of digital content. Together this comprises a globally unique Content ID Center Management Number (See Fig. 5.3.1).

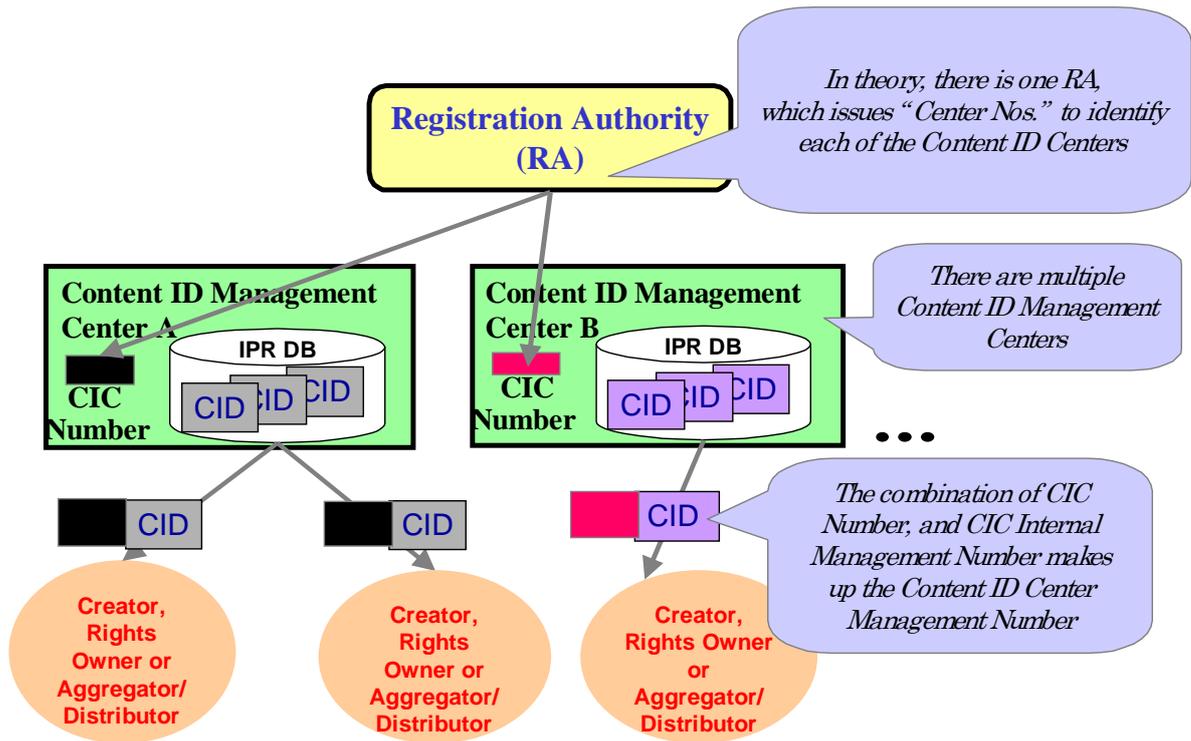


Fig. 5.3.1: Relationship between the RA and Content ID Management Center (Conceptual model)

Figure 5.3.2 illustrates the anticipated functions of the RA. As noted above, the most important function of the RA is to receive CIC applications, to compare these with standard criteria for acceptance of applications and – if the criteria are met – to register the Center. The registration process involves the entry of details relating to the CIC in the CIC Registration Database, the issuance of a CIC Number, notification of acceptance and negotiation of a contract with the CIC. Other functions undertaken by the RA include:

- monitoring of the activities of the various CICs to ensure they meet agreed operational standards;
- collection of membership fees from the CICs, levied to cover the operating costs of the RA;
- updating, management, and maintenance of the CIC Registration Database;
- publication of information relating to the cIDf Specification

- operation and management of the resolution system described in this chapter
- registration and management of the identification systems required within the cIDF Specification for real watermark IDs.

The RA Governance and Operating Rules have not been specified in this version of the Specification, but will be specified by the RA organization in a separate document.

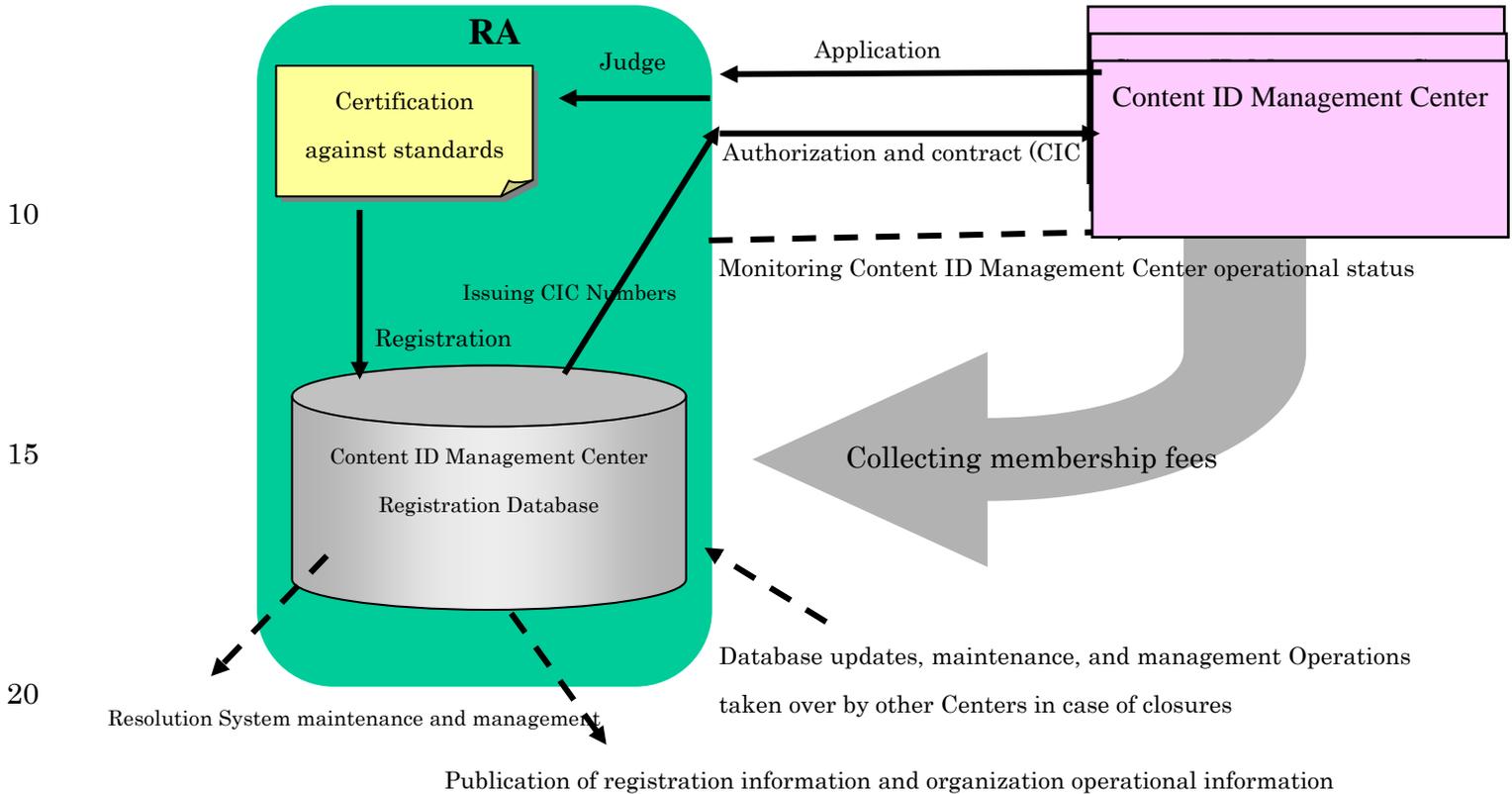


Fig. 5.3.2: RA Functions

5.3.2 *The Function of Registration Agencies (Referential information)*

The previous section explained the conceptual model of the RA. It is anticipated, however, that the RA will appoint the group Registration Agencies, which will be established to carry out RA functions in different conditions like countries, regions, markets, or applications. As shown in Fig. 5.3.3, a part of each CIDCMN is allotted to a number to enable the identification of a region. Figure 5.3.4, shows the governance structure between the RA and the group Registration Agencies. Detailed rules covering the functions and operations of Registration Agencies will be described in the RA Operational Rules, which will be defined by the RA and Agencies.

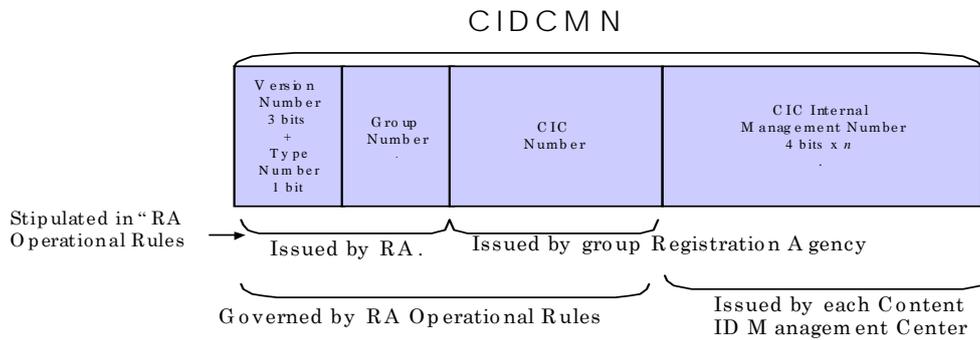


Fig. 5.3.3: Unique Code Issuers

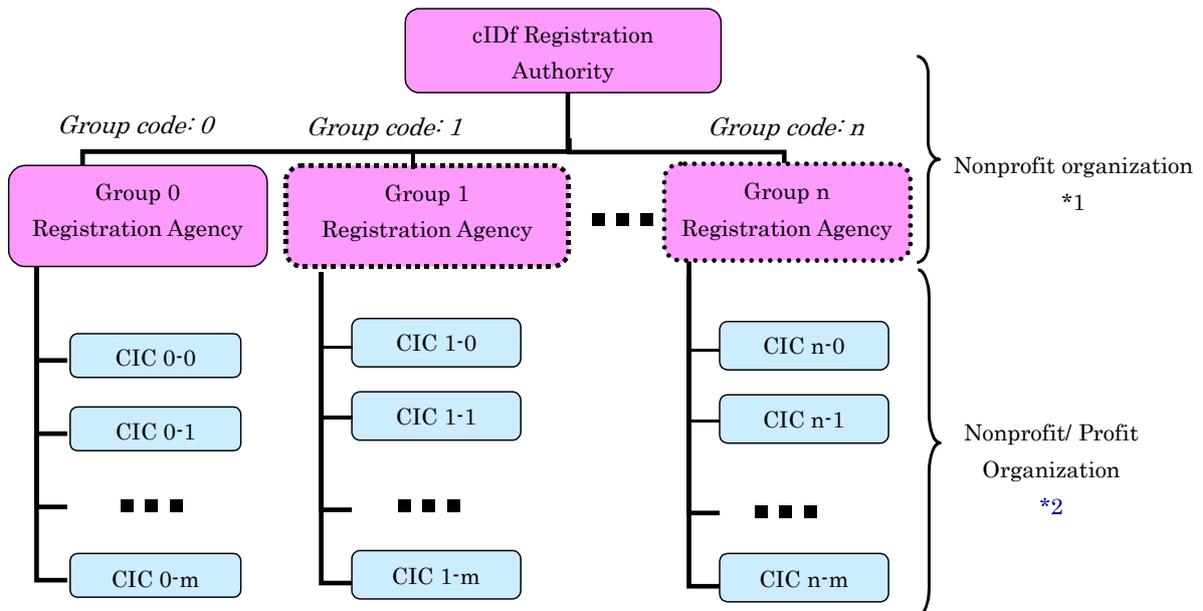


Fig. 5.3.4: Relationship between the RA and the Group RA

*1: Initially only the Registration Agency, which will also act as the cID RA, will be established in Japan. The RA is expected to be a permanent, open, non-profit organization established in accordance with on the requirements a consensus of interested parties.

*2: These would be non-profit organizations such as government agencies, Rights Owner groups, broadcasting stations, newspapers, publishing companies, libraries, museums, and brokers. Any organization wishing to be a Registration Agency or Content ID Management Center must, however, meet the operational rules set out by the RA.

5.4 cIDf Resolution

5.4.1 *What is cIDf Resolution?*

5 Under each of the Registration Agencies, there will be many Content ID Centers (CICs), each of which have IPR-DBs for storing, maintaining and managing identification and descriptive metadata relating to items and packages of digital content. It is anticipated that the relationship between a CIC and an IPR-DB may change over time.

10 For example, when a new CIC is first established, it may integrate its metadata requirements with an IPR-DB already established by another CIC; similarly, if an existing CIC were to close, the metadata relating to the digital content registered with it could be handed to another, more financially robust, CIC. Consumers that have obtained digital content containing the Content ID Center Management Number (CIDCMN) embedded may still wish to obtain metadata from the appropriate IPR-DB or other associated content from the CIC Digital Content Database. If, however, the location of the IPR-DB, or the CIC has changed as a result of one of the above scenarios, the CIDCMN will not, alone, be able to provide the necessary location information to enable consumers to perform
15 these activities.

The use of a Resolution Service will enable the original CIDCMN to point a consumer directly to the appropriate metadata or digital content, even though their original locations may have moved. This is what is meant by “cIDf Resolution.” The resolution service is operated and managed by the RA using the Handle System protocol
20 developed by CNRI.

5.4.2 *The relationship between cIDf and Handle*

CNRI’s Handle System has functionality which resolves Handles to relevant URLs and other network resources. The CIDCMN, defined in binary format by cIDf, is converted into a text expression using the method described in Section 5.5. In this way, it is possible to resolve to the location of the IPR-DB that manages the metadata
25 associated with the digital content identified by the CIDCMN. When the Handle is formed from the CIDCMN, the cIDf RA uses the Naming Authority (NA) identifier acquired from CNRI as the prefix to the CIC Internal Management Number. Figure 5.4.1 shows the flow of the cIDf Resolution.

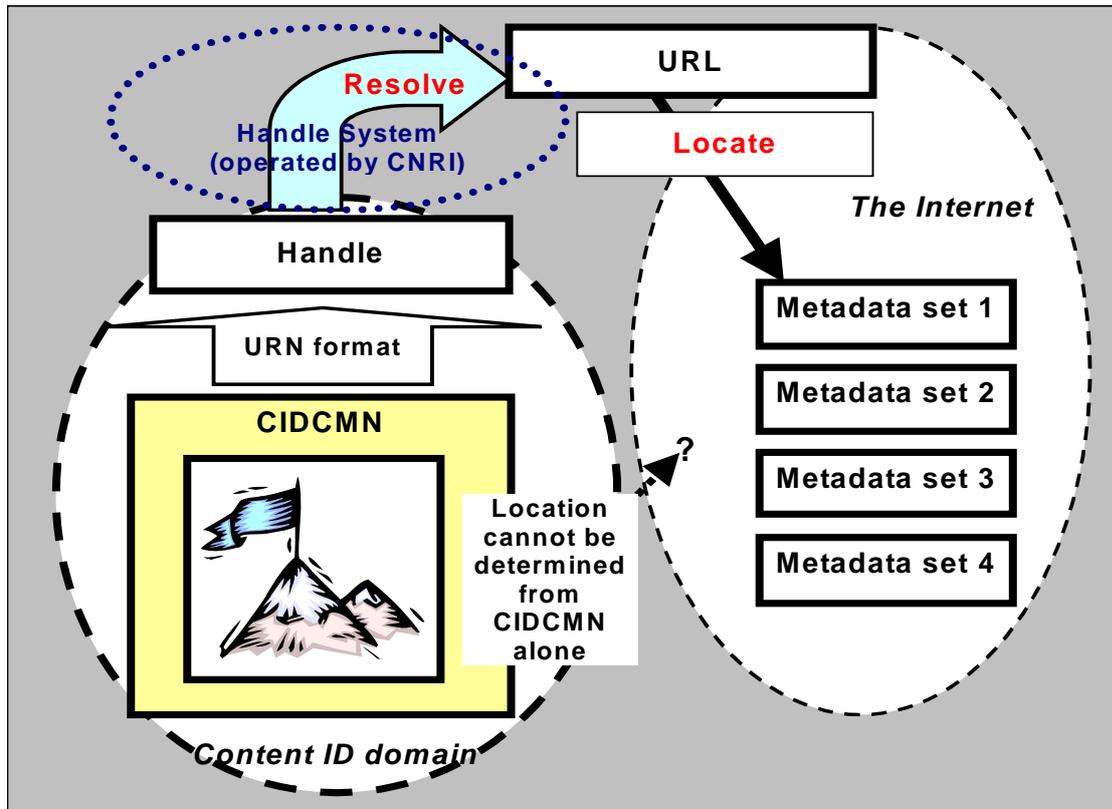


Fig. 5.4.1 Flow of cIDf Resolution

5.4.3 Handle System Management

The cIDf RA manages a Local Handle Service (LHS) in co-operation with the Global Handle Registry (GHR) of the CNRI Handle System. Therefore, under the Naming Authority identifier assigned to cIDf by the GHR, the cIDf RA can define and manage its operations independently of the GHR. The cIDf RA adds to the NA identifier allocated by the GHR the elements that make up the NA segments which include the CIC Number allocated to the various CICs. Each CIC then attaches as a suffix the CIC Internal Management Number; prefix and suffix combined form a single Handle. Figure 5.4.2 shows the global configuration of Handle System Management

As Fig. 5.4.2 shows, in cases where many CIDCMNs are to be issued, it is also possible to establish and operate an LHS server at each CIC. This offers opportunities to increase the efficiency of digital content management. However in the first stages of operation, all CIC LHS management services will be operated by the cIDf RA. Details of the operational rules needed for this architecture will be defined in the "RA Operational Rules" at a later date.

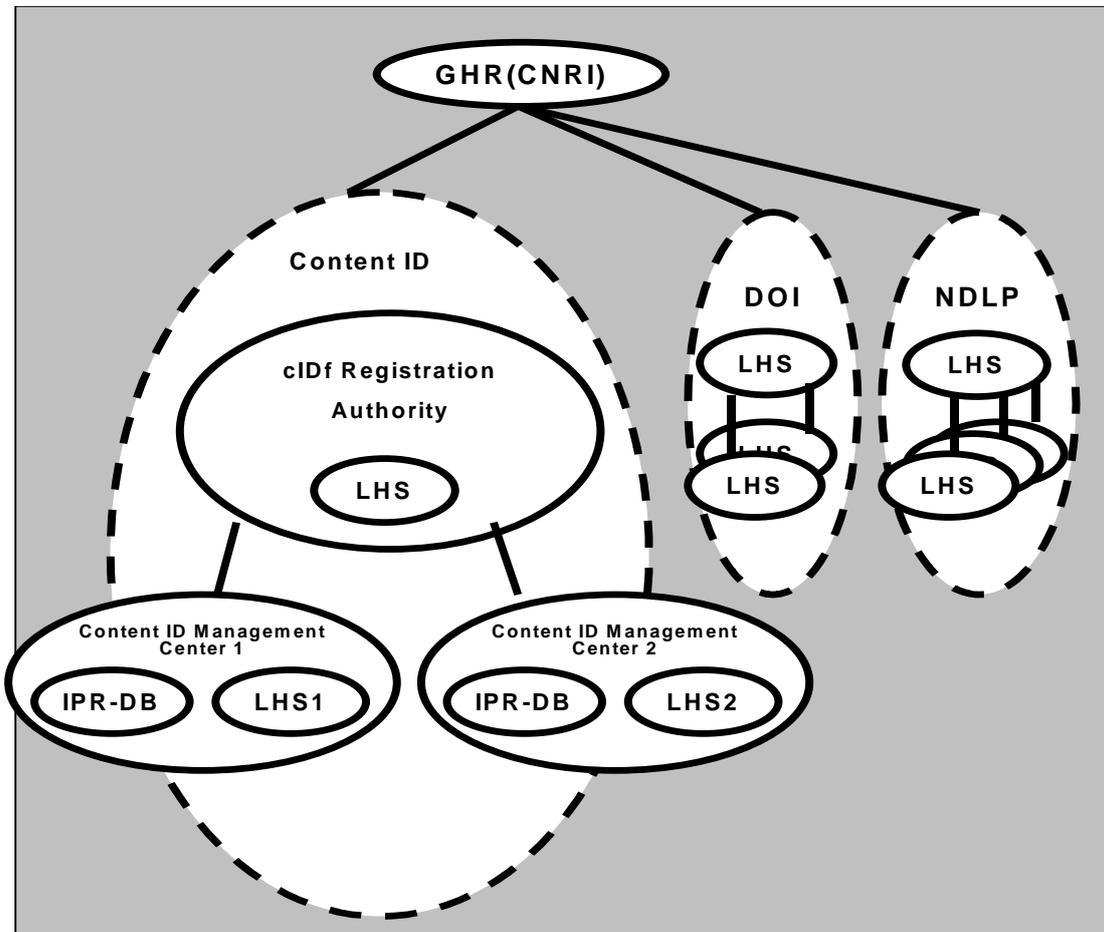


Fig. 5.4.2: Handle System Management

5.4.4 Issuing of Handles

Each time an item or package of digital content is registered with the CIC, the appropriate metadata is stored in the IPR-DB, a Content ID Center Management Number is issued, and a Handle identifier is also created and registered. The CIDCMN and the Handle therefore have a one-to-one relationship. Those CICs that choose not to use the cIDf Resolution Service do not, however, have to register a Handle identifier. Figure 5.4.3 shows the relationship between digital content and Handle identifiers.

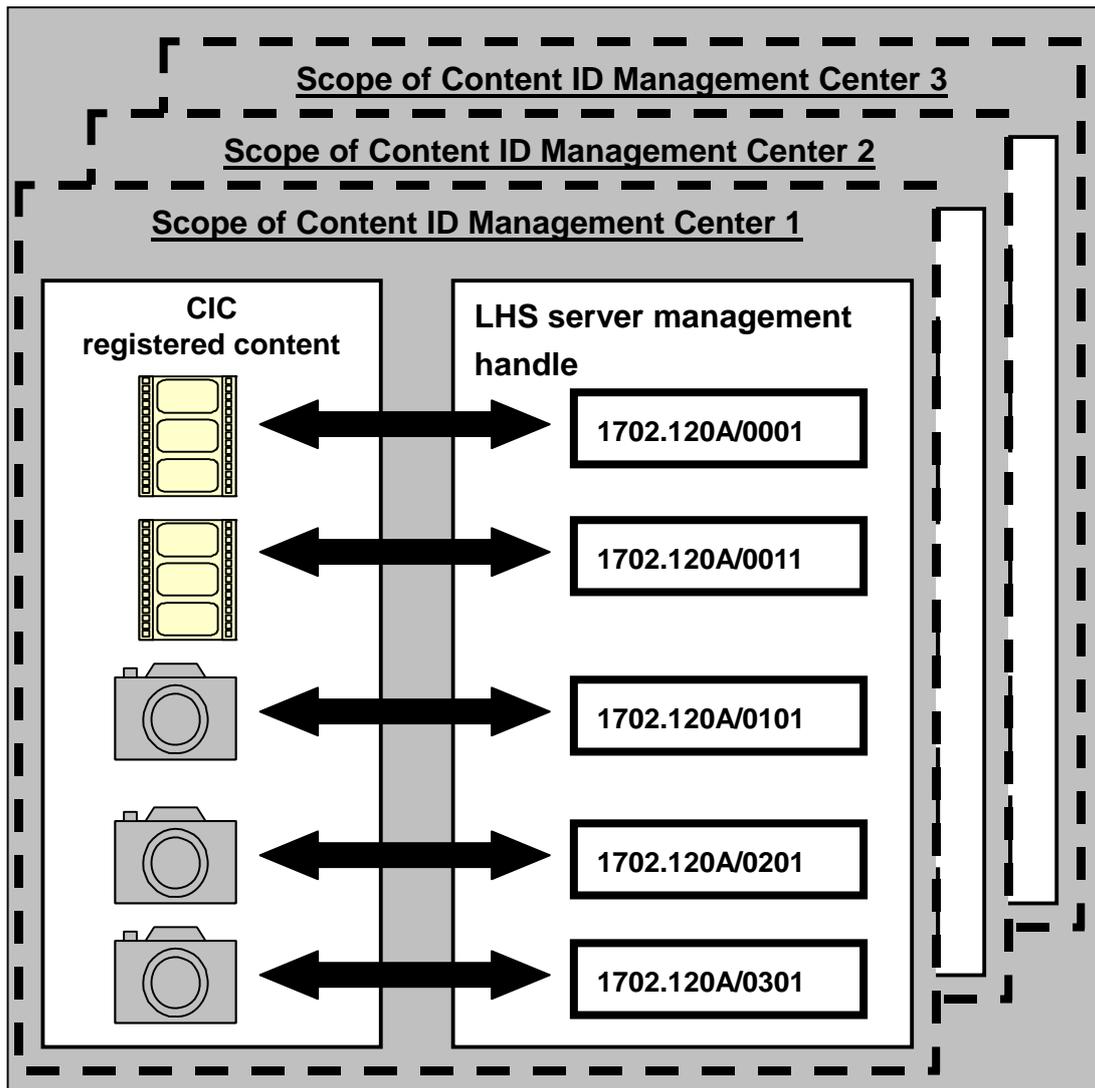


Fig. 5.4.3: Relationship between packages of digital content and Handle Identifiers

5.4.5 *The Resolution Process*

Figure 5.4.4 shows the process by which a CIDCMN is resolved using the Handle System. Firstly, any player (e.g. a Consumer) wishing to use the Handle System must install Handle client software. This software forwards the CIDCMN, which has been converted into a Handle identifier, to the Handle System GHR operated by CNRI. From the GHR the system obtains an IP address for the LHS operated by the cIDf RA.

Next, the player forwards the CIDCMN (which has again been converted into a Handle identifier) to the LHS operated by the cIDf RA, and obtains URLs associated with the digital content identified by the CIDCMN through the DNS service, for example the IPR-DB that manages the metadata associated with that digital content. Finally, if the IPR-DB is the resource that the player was seeking, they may make a request for metadata from the

IPR-DB.

The Handle System is used by the American Library of Congress, the International DOI Foundation and other institutions including cIDf; as a consequence, cIDf shares the resolution mechanism and procedures with those institutions through the GHR.

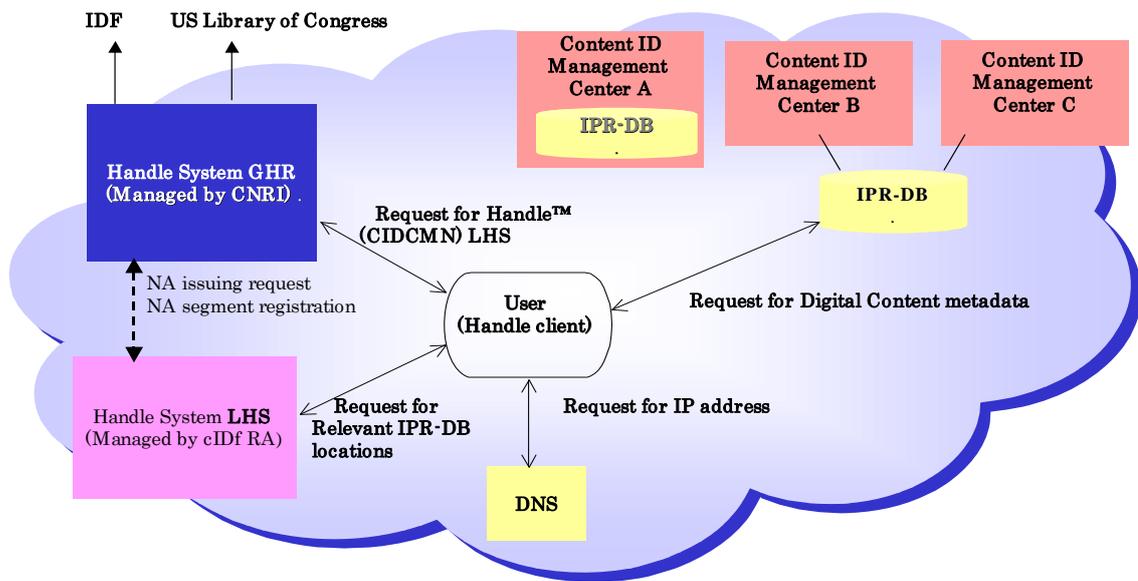


Fig. 5.4.4:cIDf Resolution Process

5.5 The CIDCMN/Handle Identifier Relationship

In the cIDf Specification, the Content ID Center Management Number and the Handle identifier are stipulated as having a one-to-one relationship. The Handle identifier is assembled using the various components of the CIDCMN in order that it can be easily derived from the CIDCMN. Figure 5.5.1 shows the relationship between the CIDCMN and the Handle identifier.

5.5.1 Handle Syntax

5.5.1.1 Prefix

The Handle™ identifier prefix consists of the Name Authority identifier assigned to the cIDf RA by the Handle System GHR. This is followed by a number that is created from the version number, the type number, the group number, and CIC Number all of which are contained in the CIDCMN. This is shown as a character value

expressed in hexadecimal ASCII.

5.5.1.2 Suffix

The suffix consists of the CIC Internal Management Number contained in the CIDCMN and is shown as a character value expressed in hexadecimal ASCII.

5

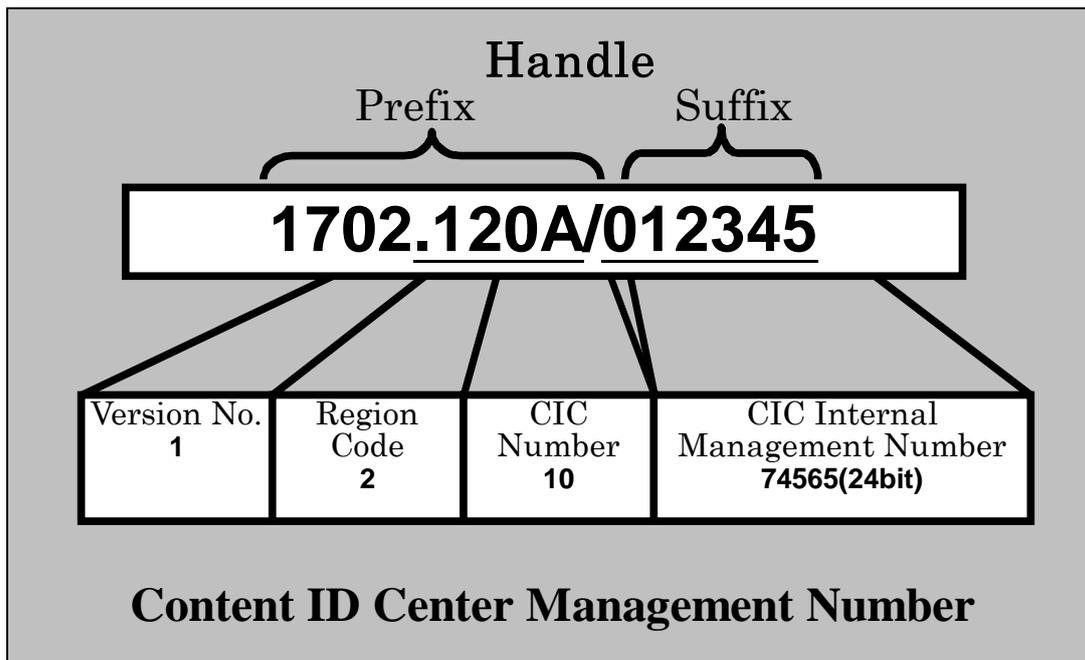


Fig. 5.5.1: Relationship between the CIDCMN and the Handle Identifier

5.5.2 Handle Identifier Prefix Naming Authority Rules

5.5.2.1 Policy

The Prefix is expressed in two layers; the Naming Authority (NA) and the NA Segment. The NA segment is made up of three layers taken from the CIDCMN, namely the version number, the type number, the group number and the CIC Number.

(1) Naming Authority

The first value in the prefix is the number assigned to the cIDf RA by the Handle System GHR. In this document the number “1702” is used as an example. The Handle Naming Authority prefix has the same value for all CICs.

(2) NA Segment

The NA segment value is assigned by the cIDf RA and is expressed in numeric values using the following elements: the Version Number, the Type Number, the Group Number and the CIC Number.

5.5.2.2 *Format*

(1) **Format**

1702.VRCN

NA NA Segment

5 (2) **NA Segment Components**

That part of the CIDCMN that makes up the NA Segment has three components: the Version Number, the Type Number, the Group Number and the CIC Number. These are expressed as 4-bit units in hexadecimal ASCII characters. Table 5.5.1 shows the NA segment components.

10 Table 5.5.1:NA segment components

Symbol	CIC Number	Length (bits)	Scope of values (hexadecimal number)	No. of characters displayed	Display value (ASCII)
V	Version Number + Type Number	3+1	0 to 7, + 0 or 1	1	0 to F
R	Group Number	4	0 to F	1	0 to F
CN	CIC Number	8	0 to FF	2	00 to FF

*The value '0' is permitted as a Display Value.

(3) **Character codes**

The character code used to express the Naming Authority identifier and the NA Segment is Unicode 2.0 whilst UTF-8 is used to express the Handle identifier. An example:

15 **1735.000A**

Where the Version Number + the Type Number = '0', the Group Number = '0' and the CIC Number = '10' the Handle prefix = 1735

5.5.3 *Handle Identifier Suffix Local Name Rules*

20 5.5.3.1 *Policy*

The suffix is made up of one layer for which the rules are created "locally" by CIDf. The suffix for CIDf is the CIC Internal Management Number, expressed as a hexadecimal character string. The text expression of the suffix, like the prefix, is as hexadecimal ASCII characters. Therefore the length of the suffix can take no more than a 4-bit boundary.

25 5.5.3.2 *Format*

(1) **Format**

nnnn..... (Variable length)

(2) **Components**

The components of the suffix are taken from the 4-bit unit segment from the first bit of the CIC Internal Management Number of the CIDCMN and expressed as hexadecimal ASCII characters. This component is shown in Table 5.2.2.

Table 5.5.2: Suffix Component

Symbol	CIC Number	Length (bits)	Scope of values (hexadecimal number)	No. of characters displayed	Display value (ASCII)
N	CIC Internal Management Number	4-bit multiples	0 to F	Variable length ¹⁰	0 to F

5

(3) Character codes

When the suffix is expressed in hexadecimal, the character code used is Unicode 2.0. UTF-8 is used as the Unicode encoding method for the Handle System.

(4) An example

10

Where the Version Number + the Type Number = '2', the Group Number = '10', the CIC Number = '10' and the CIC Internal Management Number = '075BCD15' (32-bit length), the Content ID Center Management Number would be expressed as:

Binary value = 0010 1010 0000 1010 0000 0111 0101 1011 1100 1101 0001 0101

->[Hexadecimal conversion] -> **12A0A075BCD15** -> (Unicode)

15

The Handle System identifier would be expressed as:

Handle notation = **1735.120A/075BCD15**

->(UTF-8)

Handle value = **0x21 0x27 0x 23 0x25 0x2E 0x21 0x22 0x20 0x31 0x2F 0x20 0x27**

20

5.6 Handle Metadata for the cIDf Specification

5.6.1 Handle Metadata

25

The metadata associated with Handle identifiers issued in the context of the cIDf specification is the address for the location (expressed as its URL) of the IPR-DB that stores the relevant digital content metadata. The URL enables the player to locate the IPR-DB or other sites that store information relating to the digital content. The CIC policies determine what access the player has to data stored at these locations. Figure 5.6.1 shows an example of metadata associated with a Handle identifier. For further information on the metadata that can be associated with a Handle identifier, please refer to the separate document "Operational Procedures for Registering Digital Content to cIDf-RA Resolution Servers."

¹⁰ There is no maximum length shown in the Specification, but based on actual installations, up to 128 bytes are possible when using CNRI's c library, and up to 4 Gbytes are possible when using the Java library.

```

Example of Handle metadata:
Handle: 1702.102A/F0081110000
Index: 1
URL:http://www.cIDf.org/aaa=content_id=F0081110000
  
```

Fig. 5.6.1: Example of Handle metadata

In CNRI's Handle System, it is possible to have more than one URL location specified in the Handle metadata. This feature is called "multiple resolution". However, in order to fairly spread the cost of operation among the various resolution servers in the cIDf implementation of the Handle System, cIDf has determined that for the time being, only one item of Handle metadata (the location of the IPR-DB) will be specified. Rules regarding the use of multiple resolutions will be stipulated in a future version of cIDf RA Operational Regulations.

5.7 Resolution Server System Architecture

5.7.1 Overall architecture

The Resolution Servers that between them make up the cIDf resolution system comprise the GHR operated by CNRI and the LHS operated by cIDf. The LHS has a redundant architecture, with a primary and secondary server. Figure 5.7.1 shows the overall architecture for the cIDf resolution system.

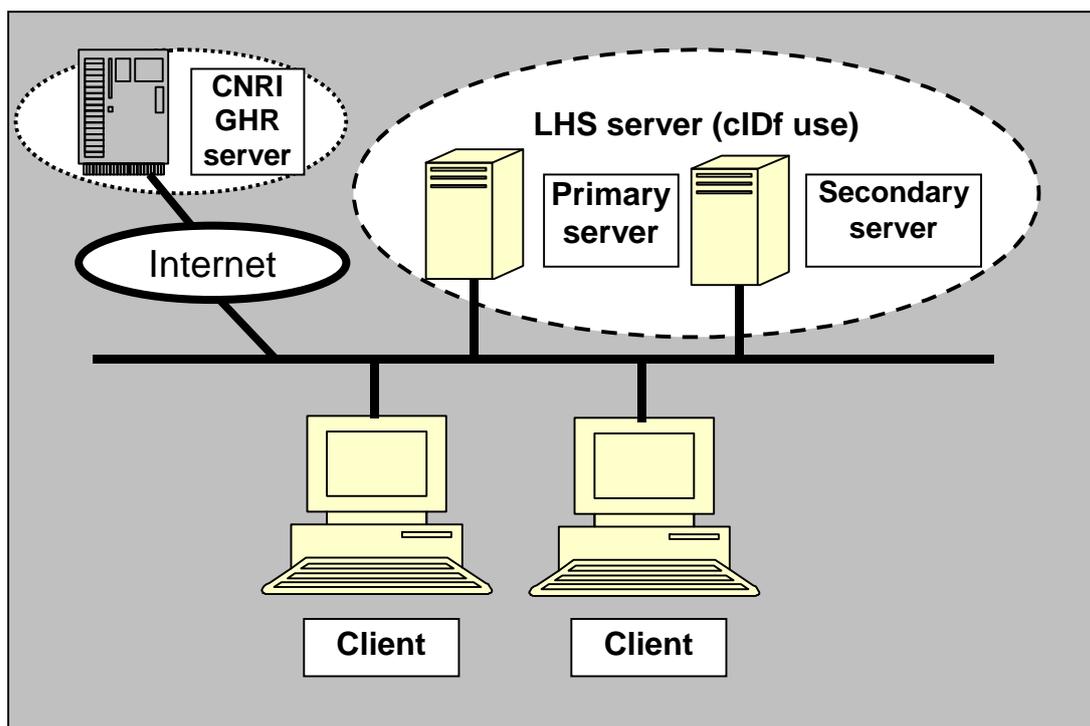


Fig 5.7.1: Resolution server architecture

CNRI GHR server	Global Handle Server for the Handle System managed by CNRI
Primary server	Primary server for the cIDf resolution system managed by the cIDf RA
Secondary server	Secondary server for the cIDf resolution system managed by the cIDf RA
Client	Registers and updates Handle information in the server. Also conducts resolution function confirmations and other client operations

5.7.2 Hardware Configuration for cIDf LHS

Table 5.7.1 shows the hardware used in the LHS server operated by the cIDf RA.

5

Table 5.7.1: Hardware index

Device name	Device type	Q'ty	OS etc.
LHS server	Sun workstation	2	Solaris 2.8
Client	PC	2	Windows 98

5.7.3 Software Configuration for cIDf LHS

(1) cIDf LHS (Handle server)

Table 5.7.2 shows the main software installed on the cIDf LHS.

10

Table 5.7.2: Handle server software

Software name	Version	URL where software is stored
Handle system server	5.1	http://www.handle.net/download.html
Java	1.2	http://www.javasoft.com/

(2) Client

Table 5.7.3 shows the software required for resolution using the Handle System in the cIDf client. The resolver used in the client is incorporated in the Web browser as a plug-in.

15

Table 5.7.3: Client software

Software name	Version	URL where software is stored
CNRI Handle System Resolver	2.1 beta	http://www.handle.net/download.html
<i>Web browser</i>		
Microsoft Internet Explorer	3.0 or higher	http://www.microsoft.com/
Netscape	3.0 or higher	http://www.netscape.com/

6. Conclusion

6.1 The Approach to cIDf Specification Conformity

On the assumption that there ought to be successful interoperation and interaction between different systems that are implemented using this Specification, the degree to which each implementation conforms to the Specification is important. If there is no guarantee of conformity amongst different systems, it will not be possible to achieve interoperation relating to digital content transactions. Of course, it is possible for digital content transactions to be carried out 'manually' based on existing contracts and practices, but in the context of future digital content distribution through the development of sophisticated e-business systems, cIDf expects that contracts, other agreements and the majority of commercial transactions will be conducted over networks as well. The effective operation of this Specification is important because it represents a minimum set of standards that do not in any way restrict freedom of business.

This section describes an approach to cIDf Specification conformity in the context of real implementations. As can be seen from Fig. 6.1.1, this Specification includes conditions regarding digital content distribution with associated CIDCMN, the CICs and the IPR-DBs. This section will also examine the degree of conformity required for the implementation of each of these functions.

6.1.1 *Digital content distribution*

The distribution of packages of digital content using the cIDf identifiers can be said to be in conformity with cIDf Specification provided the following two conditions are satisfied:

- A Content ID Management Center Number as defined is assigned with the package of digital content; and
- The CIDCMN is associated with the package of digital content using one or more of the methods defined in this specification.

If the CIDCMN is bound to the package of digital content using a watermarking technology this must be undertaken in conformity with the definitions regarding watermarks in this Specification. Likewise if binding is carried out using the DCD, this must be implemented in conformity with this Specification. This version of the Specification does not include definitions of any other binding methods.

30

6.1.2 *The Content ID Management Center and the IPR-DB*

The functions of the CIC are to issue Content IDs and to manage the IPR-DB.

(1) Issuing Content IDs

The issuing of Content IDs (Digital Item IDs and CIDCMNs) as defined in this Specification is a required condition for conformity of a CIC with the Specification

(2) IPR-DB management

5 The internal data structure of the IPR-DB is not known to the other players in the distribution chain. Therefore it is necessary to specify a protocol to those players, which determines the manner by which exchanges of data between them and the IPR-DB can take place. This version of the Specification does not define specific IPR-DB access protocols, and maintains a degree of freedom with regard to the metadata that is stored in any IPR-DB implementation. For this reason, it is difficult strictly to define a conformity requirement in this version of the
10 Specification.

It would be preferable to define the IPR-DB implementation profiles for each market or industry sector. This would enable interoperability within each market sector, through making it a requirement to conform to these profiles. However, this is an issue for future development within cIDf. Notwithstanding this, this version of the
15 Specification defines the following level of conformity for the IPR-DB.

- Install and manage all or some of the metadata attributes (including any Content ID) defined in this Specification.
- When a request for metadata is received from any player in the digital content distribution chain through
20 the use of either a CIDCMN, provide a response in accordance with the Specification depending on the authorization level of the requesting player.

Provided the IPR-DB conforms to these requirements, the CIC operating the IPR-DB is able to claim that it conforms to the cIDf Specification. However, in these circumstances, the CIC bears full responsibility for quality
25 control issues in the operation and management of the IPR-DB. This version of the Specification does not define requirements regarding CIC access protocols. The protocols described below are only for reference purposes as recommendations.

This issue is another that will have to be studied by cIDf in the future, along with designing IPR-DB installation
30 profiles.

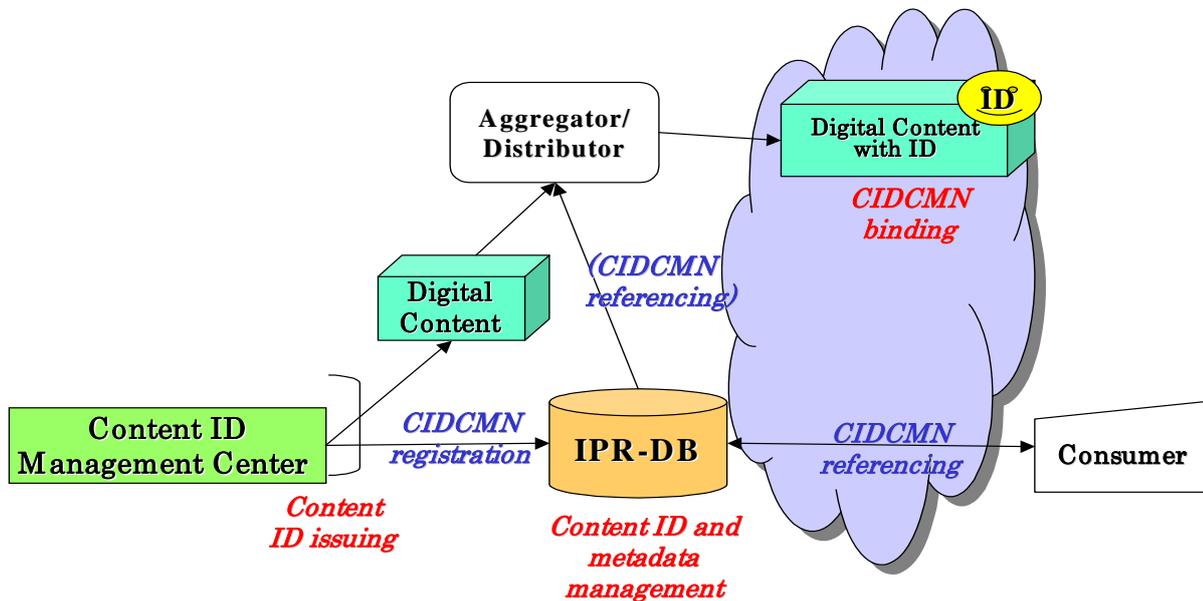


Fig. 6.1.1: Functionality of Content ID Management Center

6.1.3 Content ID Management Center Data Exchange Protocol (reference - Informative)

5 The CIC Data Exchange Protocol is a procedure for inquiring about the completeness of metadata fields stored in a CIC IPR-DB. It is not intended for inquiries regarding actual metadata values within any IPR-DB fields. By using this procedure, players within a cIDf implementation are able to ascertain in advance the completeness of another CIC's metadata fields and thus carry out subsequent data transactions more smoothly.

(1) Inquiries

10 The list of IPR-DB metadata fields required is expressed in XML and sent to the IPR-DB through the CIC. In the XML expression only the Version number, the Type number, the Group number and the CIC Number are listed. Any CIC Internal Management Numbers are obviously left open.

(2) Responses

15 In the XML expression that has been received the data fields that are contained within the IPR-DB are set as '1' (half-size ASCII numeral). Items that are not yet included in the IPR-DB are left unchanged. The list is returned to the requesting party who is then able to determine which data fields exist in the IPR-DB when constructing future data exchange enquiries.

Detailed proposals setting out the design of this protocol will be the subject of future analysis within cIDf.

6.2 Prototype Experiments

It is expected that prototype experiments will be conducted for digital content distribution involving the implementation of this version of the cIDf Specification and that these experiments will pool their experiences. The results of the prototype experiments will be reflected in the next version of the cIDf Specification.

5

6.3 Example

Examples of the application of the cIDf Specification are described in Appendix J.

6.4 Study in future

10 In future revisions, cIDf plans to guarantee the compatibility of different versions of the Specification for as long as implementations of the cIDf Specification exist. In other words, because digital content will have been distributed using components designed to meet the requirements of a variety of versions of the cIDf Specification, players involved in digital content distribution will have to support the various versions of the Specification.

15 With regard to cIDf metadata, it may not be possible to maintain complete compatibility amongst systems as a consequence of on-going revisions. However, within the Specification, there is no definition of the IPR-DB data structures and data population methods. What have been defined are the interfaces which will exist between the various players which should enable maintenance of compatibility through simple data conversion.

20 Any submissions regarding the content of these specifications should be made to the cIDf Secretariat. These submissions will be reflected in revisions of the Specification, following internal debates within cIDf Working Groups (which may include the party making the submission) and resolution at the General Assembly Meeting.

6.5 Intellectual Property Rights (IPR) Issues

25 CIDf shall bear no responsibility whatsoever in respect of Intellectual Property that becomes part of this Specification. The regulations for managing intellectual property within the context of cIDf are defined as follows:

30 (1) In the case of a proposal for a technology or business process which is the subject of IPR or, in the case of patents, is undergoing the procedures for acquisition of IPR, and when the acquisition of such technology or business process is necessary for the implementation of this Specification, as a general rule, the owner of the IPRs must grant a non-exclusive permission for use of the IPRs at a reasonable price. The owner of the IPRs must notify the cIDf Secretariat accordingly. If the owner of the IPRs is unable to grant a non-exclusive permission at a reasonable price, then the cIDf Secretariat should be advised of this in writing.

35 (2) With regard to any IPR for technologies or business processes generated through the process of development

of this Specification, as a general rule, the publication through the cIDf homepages and newsletters will prevent any IPRs being secured by parties other than specified cIDf members or other individuals associated with cIDf.

(3) As a general rule, the regulations outlined in Paragraph (1) above will apply even in cases where the process of securing patents should have taken place before the proposal is made. However, the procedures for securing patent rights must be carried out as part of the process of developing the technology or business process as part of this Specification once the proposal has been made.

(4) Once it is discovered that a technology or business process which is required for the implementation of this Specification is the property of a party who is not a cIDf member, an alternate technology or business process shall be adopted, or permission to use the technology or business process in any implementation of the Specification shall be obtained separately by each implementer.

In the event of inquiries made to the cIDf Secretariat, cIDf shall provide any information it has in relation to IPRs. IPRs information at the formation of this Specification is shown in Appendix X.
