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Multimedia home server systems – Conceptual model for digital rights management

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MULTIMEDIA HOME SERVER SYSTEMS – CONCEPTUAL MODEL FOR DIGITAL RIGHTS MANAGEMENT

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IEC 62224, which is a technical specification, has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

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The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
100/1064/DTS	100/1117A/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International Standard,
- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Due to the recent trends in the rapid popularization of mobile phones and the Internet, as well as the realization of high-speed data transmission and large-volume data recording media, high-quality content distribution and ubiquitous information services are making progress and a new type of information distribution and network sharing service has gradually emerged into the market. It is capable of utilizing terabyte-sized home servers also in private homes.

Under these circumstances, in distribution of content over shared networks, it is crucial to establish digital rights management (DRM) technologies to protect the content from illegal copying and usage. A truly successful DRM system must be built on open worldwide specifications and provide maximum interoperability and user acceptance.

An open interoperable specification that follows this technical specification is able to construct highly expandable PKI-based DRM, targeting usage between systems, considering the expansion of recent content distribution services and clients (console type AV equipment, PC, mobile phone terminal, automotive telematics terminal, and so on). This technical specification gives protocol specifications for the exchange of license information among the DRM module, the description of specifications for license information and the encrypted content formats.

During the development of this model, the main consideration was the use of contents in consumer electronics equipment connected with a home server. Also considered were distribution, storage exchange and use of content between the distribution server and the destination client system, allowing for conditions approved by the rights holder, and without loss of convenience for the users. The standardization and its popularization based on this model will enable interconnection between DRM modules allowing strong content protection in various content distribution services over networks such as the Internet and mobile phone networks.

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MULTIMEDIA HOME SERVER SYSTEMS – CONCEPTUAL MODEL FOR DIGITAL RIGHTS MANAGEMENT

1 Scope

This technical specification explains the conceptual model of a protocol specification to exchange licence information between DRM modules and outlines what should be defined as standards.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15408-1:2005, *Information technology – Security techniques – Evaluation criteria for IT security – Part 1: Introduction and general model*

ITU-T Recommendation X.509:2000, *Information technology – Open Systems Interconnection – The Directory: Authentication Framework*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions, in addition to some of those given in ITU-T Recommendation X.509, apply.

3.1.1
access condition
information that describes the content usage conditions

NOTE The access condition represents the conditional rules that restrict user ability to manipulate the content information and is a part of authorization information in the licence for the content.

3.1.2
access control list
list of conditions to access content for each principal such as content users, user groups and so on

3.1.3
asset identifier
information which identifies an asset which may include one or more contents

NOTE A licence should include an asset identifier. There are cases, for example, when an asset identifier is in accordance with a content identifier, which specify the group of content identifier or a part of the content identified by the content identifier.

3.1.4
certification authority
authority trusted by one or more users to create and assign public-key certificates

[ITU-T Recommendation X.509, 3.3.17]

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3.1.5
certificate revocation list
signed list indicating a set of certificates that are no longer considered valid by the certificate issuer. In addition to the generic term CRL, some specific CRL types are defined for CRLs that cover particular scopes

[ITU-T Recommendation X.509, 3.3.12]

3.1.6
class certificate
certificate which declares the justifiability of TREM and its class public key with its related information

3.1.7
class private key
key kept privately inside a TREM being subject to the same TREM class

NOTE The TREM developer or manufacturer should keep and manage this key privately.

3.1.8
class public key
public key corresponding to the class private key

3.1.9
content credential
information to certify integrity of the content data and the generator of the content data

NOTE This information includes a digital signature of the content, i.e., the hash value of the content data encrypted with the generator's private key. In general, it is added at the end of the protected content format (PCF) data.

3.1.10
content identifier
identifier which is a unique value assigned to each content that is a unit of information provided by the content holder

3.1.11
content key
content encryption key unique to each content under the symmetric key cryptosystem

3.1.12
data concatenation
concatenation of two bit-streams into a single bit-stream

NOTE The first bit of the second original stream is next to the last bit of the first original stream.

3.1.13
decoder TREM
TREM in which encrypted content can be decrypted and played

3.1.14
destination TREM
TREM receiving a licence

3.1.15
digital rights management
technology or functions to protect rights relating with digital content, for example, copyright, or system or module which provides these functions

NOTE Inside this system or module it manages content access conditions and behaves under these conditions.

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3.1.16
encrypted content
encrypted content data with its related meta data: broadcasting content, download content, streaming content, and so on

3.1.17
entry TREM
TREM that has the function of generating a new licence according to indication from outside and behaves as a source TREM, inside the licence distribution server and so on

3.1.18
hash function
(mathematical) function which maps values from a large (possibly very large) domain into a smaller range

[ITU-T Recommendation X.509, 3.3.32]

3.1.19
licence
information including one or more content keys and authorization information like access conditions, etc.

NOTE If it is outside a TREM, it should be a protected licence, which is protected with a session key generated in accordance with SLTP.

3.1.20
licence identifier
data as an output of the concatenated asset identifier (may be the content identifier) and the transaction identifier

3.1.21
licence move
moving of a licence from one TREM to the other

NOTE Once the licence is moved, the licence is deleted from the source TREM. A licence move with the encrypted content copy equals a content move.

3.1.22
licence relay module
LRM
system or module that relays a protected licence between TREMs through an SLTP session

NOTE LRM is an endpoint of an LRP connection and has the function of controlling internal bus and network in order to relay the protected licence via the LRP connection.

3.1.23
licence relay protocol
LRP
protocol between LRMs

NOTE Over this protocol, secure licence transaction protocol (SLTP) is realized for the Internet environment. For the SLTP, the LRP provides functions of transaction management, restart of disconnected SLTP session, protocol negotiation, and transfer of information relating with user authentication or accounting management.

3.1.24
licence server
server system that has a TREM and the LRM which mediates the transmission of a licence issued by the TREM

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