IEC 62919

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Content management – Monitoring and management of personal digital content

Gestion de contenu – Suivi et gestion du contenu numérique personnel

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONTENT MANAGEMENT – MONITORING AND MANAGEMENT OF PERSONAL DIGITAL CONTENT

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The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2803/CDV	100/2924/RVC

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

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

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

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INTRODUCTION

Users have ICT devices on which they store various digital content, such as movies, photos, music, e-books and documents. Since the capacity of each ICT device is getting larger and online storage services are provided, digital content can be stored on a wide range of devices. Users also create backup copies of digital content on multiple devices. That causes the production of multiple generations of digital copies from an original and the digital content can be put somewhere in any order. As a result, digital content goes into hiding and users can be unaware of the location where the digital content is stored. Therefore, users have difficulties in searching for and finding the digital content they want, or it takes a lot of time to find the content.

Since users may forget the provenance of the digital content saved on their devices, the information to identify the distribution channel is helpful for the users.

Even if users can easily recognize digital content, its location or its directory on a specific device, it is not enough to solve the difficulties.

This document specifies the method in which each device makes content preservation information in the specified format and sends it to the server system. The operation enables the visualization of all their digital content, which is separately stored on various devices, and an easy way to find the desired content.

In addition, the central server, which gathers the content preservation information from many users' own devices, provides the interface to derive the summary from the gathered information. By deriving users' content preservation information, a service provider can analyse the users' usage and preference information, and it helps launch new flexible digital content distribution structures.

CONTENT MANAGEMENT – MONITORING AND MANAGEMENT OF PERSONAL DIGITAL CONTENT

1 Scope

This document specifies requirements, the protocol and the data format to visualize personal content saved on the various devices, such as mobile phones, music players, personal computers, hard disk recorders and e-book devices.

This document also specifies methods for gathering information of digital content saved on personal devices and shared within a group, and to extract the gathered information by uniform application interface.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
content preservation information
information on content that is preserved in a user's device

3.1.2
content information server
server which receives and stores content preservation information

3.1.3
personal content
digital content stored on user devices

Note 1 to entry: Personal content includes content that users purchase or create by themselves.

3.1.4
content device
user device where content is stored

3.1.5
device ID
identifier to specify a device

3.1.6
user ID
identifier to specify the user in the system

3.1.7
family ID
identifier to specify a group where digital content can be shared

Note 1 to entry: Family ID is not necessarily used for a family group. It can be applied not only to a family, but also to friends, colleagues and other groups.

3.1.8
my library
application viewer to monitor and manage all content that a user has on their own device

3.2 Abbreviated terms

API	application programme interface
HTML	HyperText Markup Language
HTTP	Hypertext Transfer Protocol
JSON	JavaScript Object Notation
RDB	relational database
XMDF	ever-eXtending Mobile Document Format
XML	Extensible Markup Language

4 Basic system structure

4.1 View of digital content

Clause 4 shows the system behaviour and operations to visualize and monitor all digital content that users have. The system behaviour and operations are listed as follows.

a) Each device sends out the content preservation information to the content information server, which gathers the information on digital content saved on the device.

b) The content information server receives and stores the content preservation information. The saved content preservation information can be extracted in user ID units.

Figure 1 shows the system behaviour on a) and b) in 4.1.

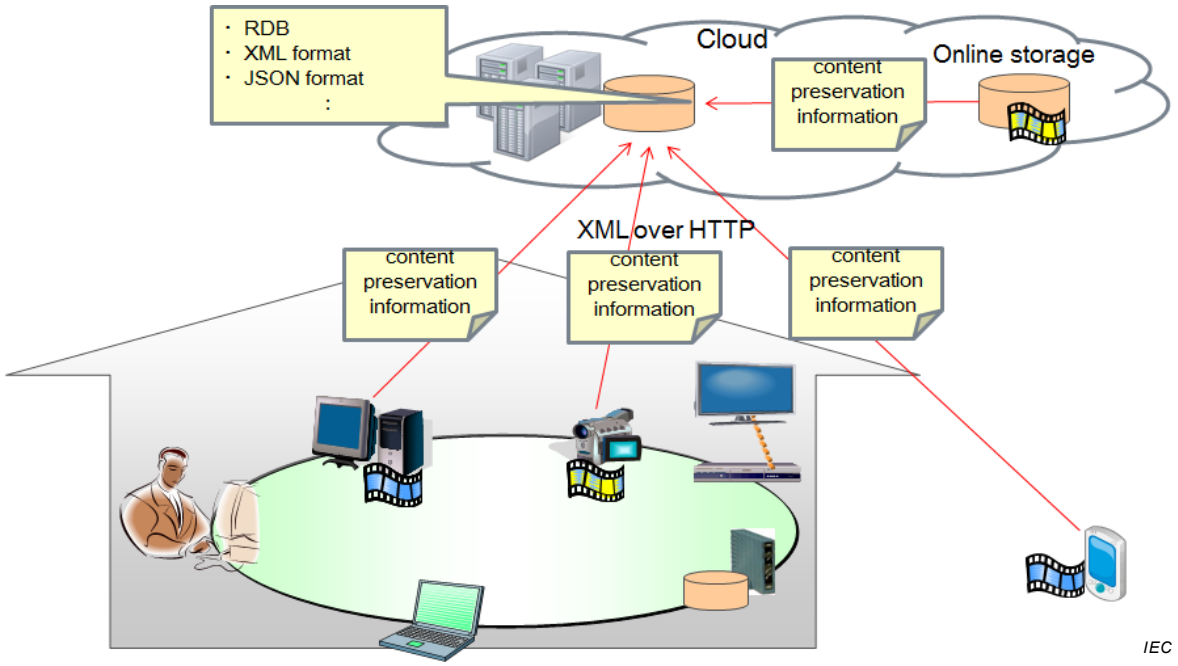

Figure 1 – Sending content preservation information to servers or cloud

c) The content information server provides an interface that enables other servers to extract content information in user ID units. The same or other servers can use the interface to create the HTML format on my library and send it to the monitoring devices. The interface also enables other servers and service providers to get, search and analyze users' content usage information or content preference information.

Figure 2 shows the interface on c) in 4.1.

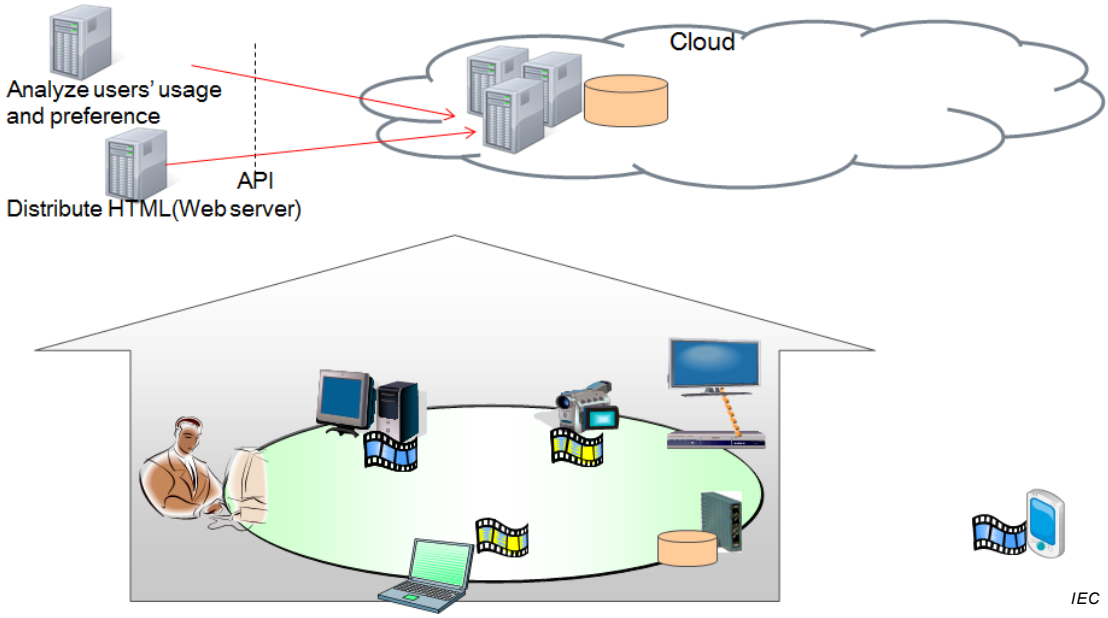

Figure 2 – Request for extracting content information

d) The monitoring device requests the web server to send the information on my library, as shown in Figure 3. The web server gets content preservation information via the interface provided on content information server and creates the HTML format.

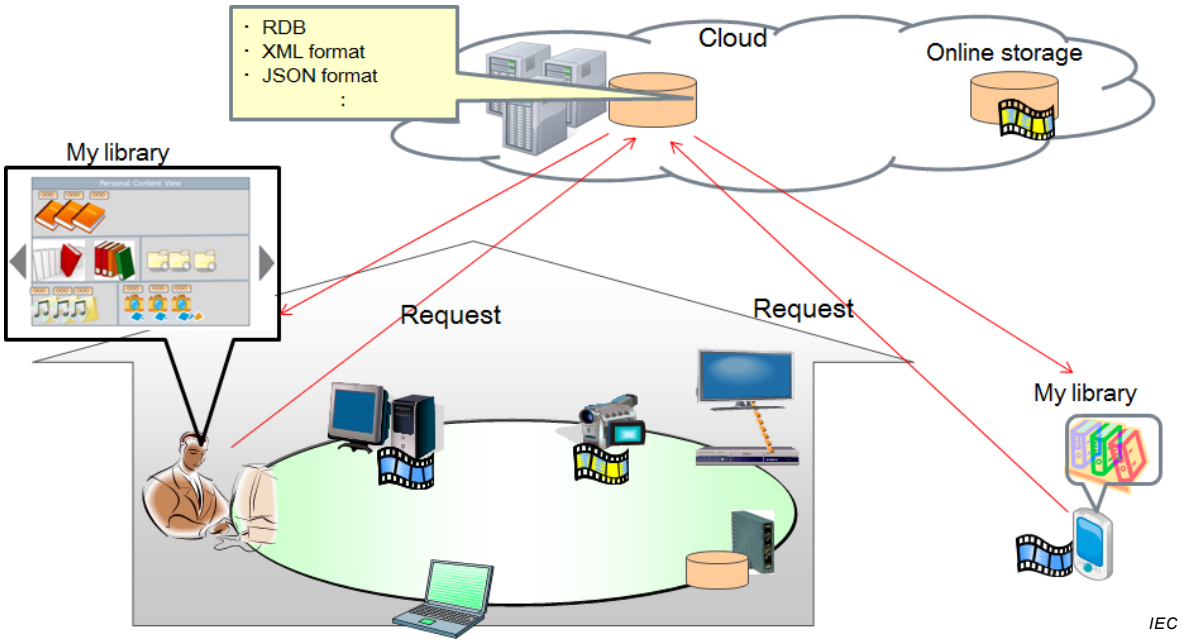

Figure 3 – Request for viewing digital content

e) The web server distributes the information on my library to the monitoring devices in user ID units.

f) If users acquire new digital content, the users' content preservation information is changed. In that case, the change is notified to the monitoring devices appropriately and the monitoring devices render the change and modify its view.

g) The content information can be shared among other users in a group, such as a family, a household or colleagues.

NOTE 4.1 d), e), f) and g) indicate the operations to distribute and render the content information on my library. They are dependent on the implementation and improvement. Therefore, d), e), f) and g) are out of scope and described as informative in this document.

4.2 Consumption of digital content

If users want to access or consume digital content from my library, the application sends a request for content delivery to the content server or other devices. Its access methods can be implemented over the existing, or new, technology.

Figure 4 shows an overview on how to consume digital content on my library.

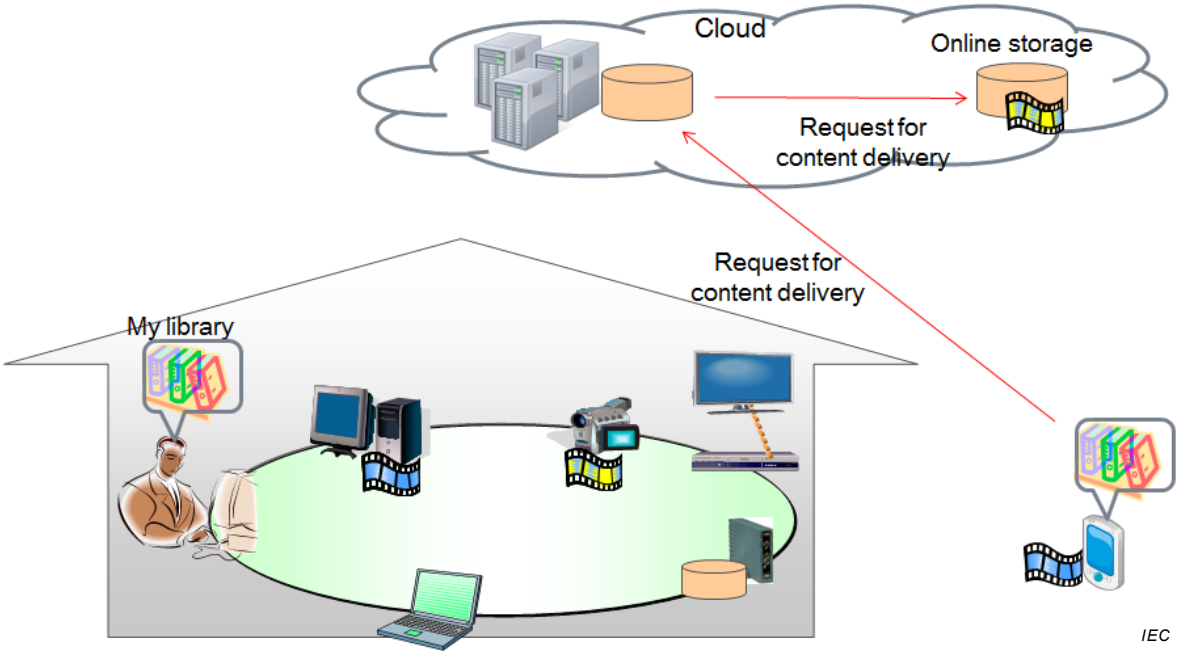

Figure 4 – Consumption of digital content

5 Requirements

5.1 General

Users register their user IDs and their devices with a central server or a cloud server. User ID and device ID are used for the communication between the server and the client's device.

5.2 Required functionalities

5.2.1 Content devices

A content device creates content preservation information by reading out necessary data in content format and sends it out to the content information server.

When the content preservation condition is changed on the content devices, the content devices send out the modification information to the server. That enables my library to display the latest condition of the stored content.

5.2.2 Content information server

Content information servers provide APIs by which other servers can retrieve content usage information, users' preference information and users' attribute information by user units. The content information server cooperates with online storage services when the users wish to consume digital content.

Content information servers can manage and implement users' access control based not only on user IDs, but also on family IDs.

5.2.3 Personal content monitoring device

When users modify the view structure or arrangement of my library on the monitoring devices, the monitoring devices save the customized change information or upload it to the content information server.

6 General measures for visualizing personal content

6.1 Protocol

In this document, it is expected that a web browser can be the application of my library for visualizing personal content. The HTTP or HTTPS protocol is used to communicate from content devices to the content information server as shown in Figure A.1. Since the HTTP or HTTPS protocol is used for internet browsing, users do not need to change the port setting on their broadband routers or their gateway routers in their home and domains.

6.2 Application layer

6.2.1 General requirement

Users would like to sort or rearrange content icons on my library by drag and drop operations, such as operations on actual bookshelves. Addition, modification and deletion of content saved on the devices should be notified to the client (visualization application) in asynchronous communication.

In addition, the client devices to visualize personal content should display the content preservation information, even if it is offline.

Figure 5 shows an example of the personal content view of my library.

Figure 5 – Example of view of my library

6.2.2 HTML5

It is expected that the HTML5 protocol be used for visualizing personal content because objects on web browsers can be moved by drag and drop, and it can implement asynchronous communication. The application using HTML5's local storage can work offline once the application receives the list of personal content.

6.2.3 Improved view of my library

If there is the same content on different content devices, the view application may indicate the presence of copies in some way, such as different colours or balloons on icons.

7 Sending content information to servers or cloud

7.1 General

7.1.1 Content meta and base information

Content preservation information, which each device sends to the content information server, includes the items listed in 7.1.2 and 7.1.3.

7.1.2 Content meta information

Content meta information <content_metainfo> includes the items listed as follows:

- method,
- device ID/device name,
- user ID,
- family ID,
- content ID, and
- sub-content ID (global ID identified in content distribution market).

After the content preservation information is stored in the content information server, family ID can be settled on the server system. For instance, users access a website on the server system, they select a family ID from the candidates to confirm a group for content sharing. Family ID is an identifier that can be applied to not only a family, but also friends, colleagues and other groups.

When a device is registered in the system, the user can add its device name to the system. A name-resolving server runs in the cloud system and manages the table between the device ID and the device name. The correspondence between the device ID and the device name helps name resolving in the system, as needed.

Content IDs may consist of two IDs that are a content ID and a sub-content ID. The sub-content ID is the identifier allocated globally in the content distribution market. The server in the cloud system can derive the content metadata from the sub-content ID. The derivation or reference operations between the sub-content ID and the content metadata will be conducted only on the server side.

7.1.3 Content base information

Content base information <content_baseinfo> includes the items listed as follows:

- filename,
- filepath,
- application type,
- create time,
- size, and
- title.

An application type that is registered in RFC6838 as a media type can be used to launch the correct program to consume digital content. Application types are regarded as classification of application programs that work on devices. When the content information server receives the content preservation information including the application type, the server saves the data as shown in Table 1.