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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS
IPTV multimedia services and applications for IPTV –
Digital Signage

Digital signage: Metadata

Recommendation ITU-T H.782

ITU-T

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Recommendation ITU-T H.782

Digital signage: Metadata

Summary

Recommendation ITU-T H.782 specifies the data elements and structures of the metadata for digital signage services. The metadata describes information for contents, terminal devices, play logs, playlist schedule, screen layout, etc. The metadata is handled by a digital signage server, a digital signage client, a content delivery server, and a content delivery client. It also specifies general information flows to describe how the metadata are used in the digital signage services.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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Digital signage, information flows, metadata.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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Recommendation ITU-T H.782

Digital signage: Metadata

1 Scope

This Recommendation addresses specifications for the metadata, which especially focus on semantics aspects, related to general digital signage services. This Recommendation defines metadata for the following digital signage functionalities:

- terminal devices;
- play logs;
- content delivery scheduling;
- playlist and content;
- playlist schedule;
- screen layout and region;
- interactive service.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- | | |
|-----------------------|--|
| [ITU-T H.741.2] | Recommendation ITU-T H.741.2 (2012), <i>IPTV application event handling: Data structures of audience measurement for IPTV services</i> . |
| [ITU-T H.780] | Recommendation ITU-T H.780 (2012), <i>Digital signage: Service requirements and IPTV-based architecture</i> . |
| [ITU-T H.781] | Recommendation ITU-T H.781 (2015), <i>Digital signage: Functional architecture</i> . |
| [ETSI TS 102 822-3-1] | ETSI TS 102 822-3-1 V1.9.2 (2016), <i>Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 – Metadata schemas</i> . |
| [IETF RFC 5139] | IETF RFC 5139 (2008), <i>Revised Civic Location Format for Presence Information Data Format Location Object (PIDF-LO)</i> . |
| [ISO 19136] | ISO 19136 (2007), <i>Geographic information – Geography Markup Language (GML)</i> . |
| [W3C XMLSchema] | W3C Recommendation (2004), <i>XML Schema Part 2: Datatypes Second Edition</i> . |

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 content [ITU-T H.780]: A combination of audio, still image, graphic, video, or data.

NOTE – A variety of formats is classified as the "data" (e.g., text, encoded values, multimedia description language introduced by [b-ITU-T H.760]).

3.1.2 metadata [b-ITU-T X.1255]: Structured information that pertains to the identity of users, systems, services, processes, resources, information or other entities.

3.1.3 playlist [ITU-T H.780]: Composed of a list of contents.

NOTE 1 – This data is created and provided by digital service providers.

NOTE 2 – This data can be selected by an end user when interactivity is supported in a digital signage terminal device.

NOTE 3 – This data may indicate an order of playing contents.

3.1.4 playlist schedule [ITU-T H.780]: Composed of a list of playlists indicated by a specific play date and/or time.

3.1.5 proof-of-play (PoP) [ITU-T H.781]: Any technique that can identify and prove that the content has been displayed on the screen.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 play log: A collection of record or information created by a digital signage system reflecting the content played, system performance, and other data.

3.2.2 region: A partial area of the screen layout to be a content displayed.

3.2.3 screen layout: A composition of one or more regions to be content displayed.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

DS	Digital Signage
GML	Geography Markup Language
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
UTC	Coordinated Universal Time
XML	eXtensible Mark-up Language

5 Conventions

This Recommendation follows the notation described in clause 6 of [ITU-T H.741.2]. The notation is used in this Recommendation to facilitate the specification of the corresponding schema:

- *Definition/Semantics*: definition and semantics of the element / attribute along with notes and value domain.
- *Support*: describes the requirement level and number of occurrence of the pertaining instance. The notations for requirement level are M for mandatory, R for recommended, O for optional. The notations for number of occurrence are (1) = (one instance), (0-1) = (zero or one instance), (0-*) = (zero or multiple instances possible), (1-*) = (one or multiple instances possible).
- *Type*: describes the type of the pertaining instance as defined in Table 1.
- *Container*: elements are defined to group associated elements.

Table 1 contains data types used in this Recommendation; alternative representations may be shown which illustrates other data structures. In case of discrepancy with any alternative representation, the correct information is to be found in Table 1.

Table 1 – Data types used in this Recommendation

Type	Name	Notes/Reference
ca:civicAddress	Civic address	Used to specify civic location. Defined in [IETF RFC 5139].
gml:Point	GML point	Used to specify simple point geometry in format of geography markup language (GML). A point consists of a <Point> element with a child <coords> element. Within <coords> the latitude and longitude values are separated by a space. Defined in [ISO 19136].
tva:GenreType	Genre	Used to specify genre of the content. Defined in [ETSI TS 102 822-3-1].
xs:date	Date	Used to specify date. The lexical form is CCYY-MM-DD where "CC" represents the century, "YY" the year, "MM" the month and "DD" the day. Defined in [W3C XMLSchema].
xs:duration	Duration	Used to specify duration of time. The lexical form is PnYnMnDTnHnMnS, where "P" represents the starts expression, "nY" represents number of years, "nM" represents number of months, "nD" represents number of days, "T" represents separation of date and time, "nH" represents number of hours, "nM" represents number of minutes, and "nS" represents number of seconds. Defined in [W3C XMLSchema].
xs:time	Time	Used to specify time. The format of time is "hh:mm:ss" where: hh indicates the hour, mm indicates the minute, ss indicates the second. Defined in [W3C XMLSchema].
xs:dateTime	Date and time	Used to specify date and time. The format of dateTime is YYYY-MM-DDThh:mm:ss.s+zzzzzz Defined in [W3C XMLSchema].
xs:ID	Identifier	Used to specify identifiers. Defined in [W3C XMLSchema].
xs:IDREF	Reference to Identifier	Used to specify a reference to xs:ID. Defined in [W3C XMLSchema].
xs:IDREFS	Reference to list of Identifiers	Used to specify a list of references to list of xs:IDs. Defined in [W3C XMLSchema].
xs:integer	Integer	Used to specify a numeric value without a fractional component. Defined in [W3C XMLSchema].
xs:language	Natural language identifier	Used to specify a natural language identifier. Defined in [W3C XMLSchema].

Table 1 – Data types used in this Recommendation

Type	Name	Notes/Reference
xs:nonNegativeInteger	Non-negative integer	Used to specify integer containing only non-negative values (e.g., 0,1,2,...) Defined in [W3C XMLSchema].
xs:positiveInteger	Positive integer	Used to specify integer containing only positive values (e.g., 1,2,...). Defined in [W3C XMLSchema].
xs:string	String	Used to specify string value which contains characters, line feeds, carriage returns, and tab characters. Defined in [W3C XMLSchema].
xs:NMTOKEN	Normalized String without spaces	Used to specify string after white space replacement. This is, any occurrence of line feeds, carriage returns, contiguous of spaces, and tab are replaced by a single space along with leading or trailing spaces removed. Defined in [W3C XMLSchema].
xs:NMTOKENS	List of NMTOKEN	A whitespace-separated list of NMTOKEN values. Defined in [W3C XMLSchema].
xs:anyURI	URI	Used to specify uniform resource identifier (URI). Defined in [W3C XMLSchema].

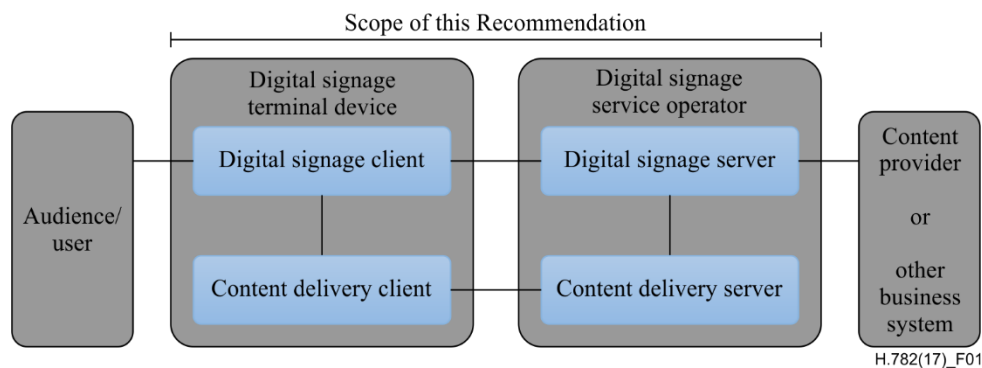
6 Overview

This Recommendation address metadata related to digital signage services to present details of contents and service information. [ITU-T H.780] specifies some elements of metadata that are applicable to digital signage services.

Digital signage server has capabilities for administration of digital signage system, control of content delivery, and management of digital signage terminal devices. Digital signage clients are responsible for content presentation, and interactions with audiences. The detailed functionalities of digital signage server and digital signage client are defined in [ITU-T H.781].

This Recommendation selects basic elements/attributes from these specifications that are applicable to digital signage services. Names of elements/attributes are quoted as they are in the specifications, in order to keep the relationship between the standards clear.

Figure 1 illustrates a reference functional model for digital signage (DS) services as per [ITU-T H.781], and the scope of this Recommendation.



NOTE – Figure 1 as per [ITU-T H.781].

Figure 1 – Digital signage service reference architecture

Entities in Figure 1 are as follows:

- **Audience/User:** the audience or user, or his/her own device;
- **DS terminal device:** the device that displays content received from a DS service operator;
- **DS service operator:** the business operator that provides DS services. It manages DS terminal devices for displaying content received from a content provider;
- **Content provider or business system:** this entity provides content to the DS service operator for a particular purpose, e.g., advertisements, information, alerts.

Main groups of functions within the DS terminal device and the DS service operator are as follows:

- **DS client:** is responsible for content presentation and interactions with audiences;
- **Content delivery client:** is responsible for acquiring content through a network;
- **DS server:** has capabilities for administration of DS system, control of content delivery and management of DS terminal devices;
- **Content delivery server:** delivers content to the content delivery client.

This Recommendation describes metadata handled by these four functional groups.

7 Configuration of terminal device

7.1 Client configuration

The digital signage server configures the digital signage client with a set of metadata in the "client configuration" which includes allocation of *TerminalId*; see Figure 2. The digital signage server can reconfigure the digital signage client with the configuration information needed.

A set of elements/attributes for "client configuration" metadata is shown in Table 2.

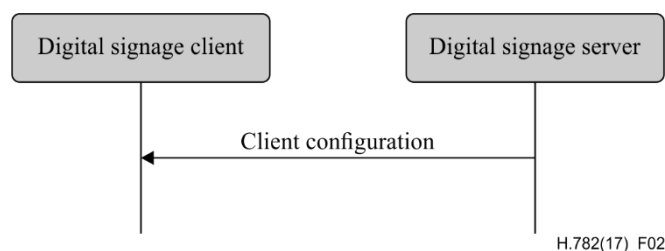


Figure 2 – A flow for client configuration

Table 2 – Metadata for "client configuration"

Element/Attribute	Definition/Semantics	Support	Type
ClientConfiguration	Container to include client configuration information.		
TerminalId	Element of ClientConfiguration. An identifier of a terminal device. This value is allocated by the digital signage server.	M(1)	xs:ID
Name	Element of ClientConfiguration. Name of the terminal, which can be in different languages.	O(0-*)	xs:string
KeywordList	Element of ClientConfiguration. Container to include list of keywords.	O(0-1)	
Keyword	Element of KeywordList. A keyword for the usage of the terminal device which can be in different languages. A keyword can be a single word or an entire phrase made up of multiple words.	O(1-*)	xs:string
Configuration DateTime	Element of ClientConfiguration. Describes date/time of configuration of the terminal device.	O(0-1)	xs:dateTime
ScreenlayoutId RefList	Element of ClientConfiguration. A list of reference identifiers of the screen layout information (see Table 15).	O(0-1)	xs:IDREFS
TerminalGroupIdRef	Element of ClientConfiguration. A reference identifier of the terminal group information (see Table 9).	O(0-1)	xs:IDREF
Username	Element of ClientConfiguration. The user name to access the terminal device.	O(0-1)	xs:NMTOKEN
Password	Element of ClientConfiguration. The password to access the terminal device.	O(0-1)	xs:string
AVControl	Element of ClientConfiguration. Container to include audio and visual information.	O(0-1)	
Volume	Element of AVControl. Control the sound volume level of the terminal device. Suggested unit is in percentage (%).	O(0-1)	xs:string
Brightness	Element of AVControl. Control the monitor brightness level of the terminal device. Suggested unit is in percentage (%).	O(0-1)	xs:string
ContentDelivery ServerIdRefList	Element of ClientConfiguration. A list of reference identifiers of content delivery servers (see Table 5).	O(0-1)	xs:IDREFS
LogServerIdRef	Element of ClientConfiguration. A reference identifier to a log server (see Table 6).	O(0-1)	xs:IDREF