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Information technology — Coding of multimedia and hypermedia information —

Part 5:
Support for base-level interactive applications

Technologies de l'information — Codage de l'information multimédia et hypermédia —

Partie 5: Support pour applications interactives de niveau fondamental

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Contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialised system for worldwide standardisation. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organisation to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organisations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting vote.

International Standard ISO/IEC 13522-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 13522 consists of the following parts, under the general title *Information technology – Coding of multimedia and hypermedia information*:

– *Part 1: MHEG object representation – Base notation (ASN.1)*

– *Part 3: MHEG script interchange representation*

– *Part 4: MHEG registration procedure*

– *Part 5: Support for base-level interactive applications*

– *Part 6: Support for enhanced interactive applications*

Annexes A and B form an integral part of this part of ISO/IEC 13522. Annexes C and D are for information only.

Information technology — Coding of multimedia and hypermedia information —

Part 5:

Support for base-level interactive applications

1 Scope

This part of ISO/IEC 13522 specifies semantics and final-form interchange syntax for MHEG-5 objects, based on concepts defined in ISO/IEC 13522-1. These objects are intended for use in the domain of simple client/server interactive multimedia applications, e.g. (Near) Video on Demand applications, navigation and browsing applications.

1.1 Specificity of the scope

Since it is expected that this part of ISO/IEC 13522 be used for interoperability of applications across platforms, the scope focuses on a specific and precise definition of MHEG-5 classes. This part of ISO/IEC 13522 recognises the semantics implied by the specification of the MHEG-5 objects and by interpretation of MHEG-5 behaviours within the using system.

1.2 Issues outside the scope of this part of ISO/IEC 13522

The scope excludes any standardisation of models, services, systems, protocols or applications that are likely to make use of MHEG-5 objects.

The coded representation of content data is not in the scope of this part of ISO/IEC 13522.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 13522. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 13522 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of ISO and IEC maintain registers of currently valid International Standards.

— ISO/IEC 646:1991: *Information technology – ISO 7-bit coded character set for information interchange.*

— ISO/IEC 8824-1:1995 | ITU-T Recommendation X.680 (1994): *Information technology -- Abstract Syntax Notation One (ASN.1): Specification of basic notation.*

— ISO/IEC 8825-1:1995 | ITU-T Recommendation X.690 (1994): *Information technology -- ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*

— RFC 1521:1993: *MIME (Multipurpose Internet Mail Extensions) Part one: Mechanisms for specifying and describing the format of Internet message bodies.*

3 Terms and definitions

For the purposes of this part of ISO/IEC 13522, the following definitions apply:

3.1 abstract class
Class that is never instantiated into an interchangeable MHEG-5 object
NOTE - An abstract class defines attributes, behaviours and semantics of actions that may be exchanged as parts of any MHEG-5 object of the concrete subclasses of this abstract class.

3.2 action
Set of elementary actions

3.3 active
State of any MHEG-5 object when the Activation behaviour has been completed successfully for this object
An active object has its *RunningStatus* set to *True*.

3.4 application domain
Specific domain of applications making use of this part of ISO/IEC 13522 and providing additional tools and values in order to create a practical instance of an MHEG-5 environment
NOTE - More information on application domains is provided in Annex D of this part of ISO/IEC 13522.

3.5 application scope
Common scope of all MHEG-5 objects (scenes and ingredients) accessed from an MHEG-5 application

3.6 attribute
Named and typed value attached to a class

3.7 available
State of any MHEG-5 object when the Preparation behaviour has been completed successfully for this object
An available object has its *AvailabilityStatus* set to *True*.

3.8 base class
MHEG-5 class which defines some attributes, behaviours and semantics of actions that are shared by a given MHEG-5 class

3.9 concrete class
Class of any MHEG-5 object that may be encoded and interchanged according to the specifications provided in Annex A or Annex B of this part of ISO/IEC 13522

3.10 elementary action
Abstract representation of a message that may be sent to an object
NOTE - This part of ISO/IEC 13522 defines the semantics of available elementary actions for each MHEG-5 class. Note that the MHEG-5 class Action (with a capital A) has a different meaning described in clause 49 of this part of ISO/IEC 13522.

3.11 event
Abstract representation of an occurrence of a special meaning for any MHEG-5 object
NOTE - Events are used to trigger Link conditions and bring out the execution of sequences of elementary actions.

3.12 exchanged attribute
Attribute that is part of the interchangeable byte-code representation of an MHEG-5 object, and transmitted with that object

3.13 inactive
State of any MHEG-5 object when the Deactivation behaviour has been completed successfully or when no Activation behaviour has been applied successfully on this object
An inactive MHEG-5 object has its *RunningStatus* set to *False*.

3.14 inherited attribute
Attribute that is defined in a base class of the class of the MHEG-5 object

3.15 interchangeable representation
Octet string, which contains the encoded exchanged attributes of this MHEG-5 object complying with the ASN.1 syntax and encoding provided in Annex A of this part of ISO/IEC 13522, or, when textual representation is preferred, with Annex B of this part of ISO/IEC 13522

3.16 internal attribute
Abstract data structure, never byte-code encoded or exchanged, that is used to define semantics of internal behaviours or actions for any MHEG-5 object
NOTE - Any MHEG-5 engine might consider that an internal attribute is part of the internal representation of the MHEG-5 object; however, this is not mandatory. What is mandatory is to implement the functionality described by these internal attributes.

3.17 internal behaviour
Abstract function that defines the semantics of MHEG-5 elementary actions for any MHEG-5 class
NOTE - An internal behaviour of a class is most of the time overridden by internal behaviours of subclasses of this class. An MHEG-5 engine might consider that an internal behaviour of a class is a private method of this class, however this is not mandatory.

3.18 MHEG-5 application
Set of scenes and control information that allows the user to navigate between scenes
NOTE - the MHEG-5 class Application (with a capital A) has a different, more specific meaning that is given in clause 10 of this part of ISO/IEC 13522.

3.19 MHEG-5 class
Abstract definition of exchanged and internal attributes of parts of interchangeable multimedia / hypermedia objects as well as definition of the semantics of internal behaviours and the effect of MHEG-5 actions for these objects

3.20 MHEG-5 engine
Process or set of processes that interpret MHEG-5 objects encoded according to the encoding specifications defined in Annex A or in Annex B of this part of ISO/IEC 13522

3.21 MHEG-5 object
Instance of any MHEG-5 class
NOTE - An MHEG-5 object is not a physical object, but rather an abstraction that may have many representations of different types. Various software services handle such representations.

3.22 MHEG-5 scene
Structure that co-ordinates the presentation (visual and audible) of MHEG-5 objects

3.23 mix-in class
Abstract class that does not inherit from the Root class
Examples: *Interactible* class, *TokenManager* class.

3.24 non-available
State of any MHEG-5 object when the Destruction behaviour has been completed successfully or when no Preparation behaviour has been applied successfully on this object
A non-available object has its *AvailabilityStatus* set to *False.* Even if an MHEG-5 object does not exist in the MHEG-5 engine, its *AvailabilityStatus* exists and is set to *False.*

3.25 subclass
Any MHEG-5 class that shares the same attributes, behaviours and semantics of actions as another MHEG-5 class.

4 Conformance

This clause specifies conformance requirements for MHEG-5 engines and for MHEG-5 applications.

4.1 Conformance of MHEG-5 objects

Any MHEG-5 object shall have an octet representation. For interchange purposes, the octet representation shall be compliant with the ASN.1 syntax and encoding defined in Annex A, or with the textual notation grammar defined in Annex B. The application domain shall choose which representation to use: that of Annex A or that of Annex B; and that representation shall then be used exclusively throughout the application domain.

The attributes of any MHEG-5 object shall meet all requirements defined in the relevant subclauses of this part of ISO/IEC 13522.

4.2 Conformance of MHEG-5 engines

Conformance of MHEG-5 engines can only be measured with regard to a complete application domain definition. To fully specify conformance, an application domain shall define, in addition to the interchange representation, the following:

1. a set of classes from the list of all classes of this part of ISO/IEC 13522, as prescribed in 4.2.1
2. a set of features from the list in 4.2.2
3. additional concrete choices as listed in 4.2.3.

NOTE - Refer to Annex D of this part of ISO/IEC 13522 for an example of complete definition of an application domain.

4.2.1 Conformance to the acceptance of a set of Classes and Elementary Actions

Conformance to the acceptance of a set of Classes and Elementary Actions is defined as follows.

Any MHEG-5 engine is required to implement at least the following minimum set of classes:

- Application Class

  All attributes, events and internal behaviours shall be implemented.
- Scene Class

  All attributes, events and internal behaviours shall be implemented.
- Link Class

  All attributes, events and internal behaviours shall be implemented.
- Action Class

  All attributes, events and internal behaviours shall be implemented.

All application domains shall define compliance to a set of classes containing at least the minimum set above. An application domain may specify a larger set of classes and elementary actions for compliance; in any case, the application domain shall clearly list the classes and elementary actions supported.

When additional classes are implemented in any MHEG-5 engine, the engine shall implement all of their attributes, events, internal behaviours and elementary actions as defined in this part of ISO/IEC 13522, with the possible exception of optional features listed in 4.2.2. Concerning the Action class, the engine shall implement all effects of MHEG-5 elementary actions corresponding to the specified set of classes . It is the role of each application domain to choose and well define a set of classes that is required for that specific application domain.

If a class is not handled by an MHEG-5 engine, and an object of this class is sent to the MHEG-5 engine, this causes an error that is handled by the default error handling defined in subclause 53.7.

4.2.2 Conformance to a set of engine functionality

Conformance to a set of engine functionality is defined as follows.

Any MHEG-5 engine shall provide all normative mechanisms defined in clauses 51 to 54.

Any MHEG-5 engine shall implement all effects of MHEG-5 actions and the internal behaviours of MHEG-5 classes included in the definition of their application domain, except for the following optional features:

- Ancillary connections (corresponding to OpenConnection and CloseConnection actions),
- Caching, (corresponding to caching of MHEG-5 objects and content data of Ingredient objects),
- Cloning, (corresponding to the Clone action defined in Ingredient class).
- Free-moving cursor,
- Bitmap and Video scaling, (corresponding to the ScaleBitmap and ScaleVideo actions of the Bitmap and Video classes).
- Stacking of Applications, (corresponding to the Spawn action of the Application class),
- Trick mode, (corresponding to the SetSpeed action of the Stream class),

An application domain shall clearly define a list of which ones of the above features are mandatory or optional for conformance to the application domain.

4.2.3 Additional requirements for conformance specification

In addition to the two items above, the following tables shall be specified by a given application domain to fully define conformance.

NOTE - For each one of these table, a concrete example is given in Annex D (informative), thus defining an example of application domain.

- Content Data Encoding

The application domain shall specify which type of content data is supported and which type of encoding is supported. The following two tables shall be filled for each application domain.

Attribute	Permissible values
FontAttributes	
FontName	
AbsoluteColour	
CharacterSet	
TransitionEffect	

Encoding table:

Type of content	Content Encoding	Hook Values (Integer)
Font encoding format		
Palette encoding format		
Bitmap encoding format		
Text encoding format		
EntryField encoding format		
HyperText encoding format		
Stream encoding format		
LineArt encoding format		
CursorShape encoding format		
InterchangedProgram encoding format		
AbsoluteColour encoding format		