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Part 1:

MHEG object representation — Base notation
(ASN.1)

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

Partie 1: Représentation d'objet MHEG — Notation de base (ASN.1)



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, 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 a vote.

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

This part of ISO/IEC 13522 is also published by ITU-T as ITU-T Recommendation T.171, but not as identical text.

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*

Annex A forms an integral part of this part of ISO/IEC 13522. Annexes B to G are for information only.

0 Introduction

This part of ISO/IEC 13522 provides an encoding for multimedia/hypermedia information to be used and interchanged by applications in a wide range of domains.

The design of this part of ISO/IEC 13522 has been driven by an analysis of application requirements to identify the generic aspects of these applications and incorporate them in a simple encoding.

0.1 Application domains for requirements analysis

In recent years, an explosion of multimedia applications and services has been apparent in many domains. This subclause illustrates the very wide range of audiovisual computer-based applications on which the requirements analysis has been made.

- **Training and education (also known as teletraining):** The extension of data processing and telematics to support audiovisuals makes it a more attractive tool to educators because it improves the interface with the students. There is also a need to exchange audiovisuals between tools and to reuse audiovisuals in other applications. The audiovisuals need be structured in such a way that they can be updated, modified and personalised easily.
- **Simulation and games:** These can be made much more realistic by the use of multiple media in computer-based systems. Examples are flight and maritime simulators; these applications are highly interactive.
- **Sales and advertising:** The association of attractive audiovisuals, showing the products to best advantage, with the stock control and ordering process is a natural commercial evolution.
- **Office information systems, engineering documentation:** There is a long-standing need to be able to integrate drawings, images, audio and video into all types of office documentation. Integrated documents would also provide an attractive means of internal enterprise communication.
- **Culture:** The computer processing of audiovisual information makes it possible to extend the audience for theatres, museums and cultural events. It also opens the possibility of new art forms.
- **Electronic publishing and electronic books:** Much material that is currently published on paper could be enhanced by the integration of audiovisuals and by being available in a hypertext manner over a telecommunication network, for example, tourist guides and yellow pages, which could be a mixed sales and advertising application.
- **Public information:** The use of audiovisual interfaces makes it possible for the public to use computer-based, real-time information systems, for example, a kiosk at which information is accessed through videotex or locally from CD.
- **Computer-supported multimedia co-operative work:** There is a need to form effective teams of people who are geographically separated but have to share text, graphics, image, audio and other information, for example for remote maintenance, joint authorship or multimedia electronic mail.
- **Medical applications:** There is a need for a timely retrieval of audiovisual information, including medical images, medical data and case history, in an integrated way from a remote site. This could be a mixed co-operative work application with different medical experts.
- **Interactive television applications:** The emergence of digital television systems on terrestrial, satellite or cable networks, as well as the availability of new modulation and transmission techniques on the telephone network, creates favourable conditions for a new offer of interactive multimedia services based on the merging of television and telematics technologies, providing the users with interactive access to video documents.

- **New classes of applications:** The widespread availability of remote access to audiovisual data processing systems open the way to new classes of applications such as interactive television, customised news programmes and archive materials.

In the following paragraphs, the specific needs of communicating multimedia/hypermedia applications from these domains are examined, leading to a list of application requirements. This set of requirements constitutes the global framework of this part of ISO/IEC 13522.

0.2 Multimedia/Hypermedia application requirements

In the various domains presented above, interactive multimedia systems are perceived to have increased impact on users through their use of image, video and audio, in addition to traditional text information.

The development of these systems is based upon support for multimedia information in the following areas:

- **Platforms:** Emerging compression standards, such as JPEG (ISO/IEC 10918) or MPEG (ISO/IEC 11172, ISO/IEC 13818), have enabled the development of dedicated hardware, which will soon be provided as a standard system resource.
- **Storage:** The increasing capacity of magnetic and optical disks, combined with compression techniques, enables the storage of increasing amounts of high bandwidth information.
- **Communication:** The increasing availability and bandwidth of digital transmission media, such as ISDN and other broadband telecommunication and broadcasting networks, enables the appropriate exchange of large amounts of data.

Using these facilities, multimedia applications are anticipated to be designed to run on heterogeneous platforms and to be interconnected to offer multimedia services.

These multimedia applications and services will use large quantities of structured multimedia objects resident in workstations, stored on digital interchange media and retrieved or distributed from remote sources through networks. These multimedia data will represent a significant investment and it is vital that the information should be applicable in a world of rapidly evolving systems and technologies. In particular, it is important that information should be interchangeable between the data structures supported by different applications.

The following application requirements can be identified:

- a) multimedia database retrieval;
- b) frequent updates of multimedia data;
- c) manipulation of a set of data elements;
- d) creation of multimedia documents on a range of workstations;
- e) composition of multimedia data in time and space;
- f) ability to link part of a document with some other part of the same or another document in an open hyperdocument environment;
- g) synchronisation:
 - 1) elementary synchronisation: two objects are synchronised with regard to the same reference origin time (parallel mode) or one with regard to the other (sequential mode);
 - 2) chained synchronisation: a set of objects are presented one after another in the form of a chain;
 - 3) cyclic synchronisation: one or more objects are repetitively presented;
 - 4) conditional synchronisation: the presentation of an object is linked to the fulfilment of a condition;
- h) reuse of multimedia data by integration in different documents;

- i) exchange of multimedia data between heterogeneous systems;
- j) space wide range of users, including closed user groups;
- k) real-time interactivity, including acquisition of multimedia data;
- l) telecommunication of multimedia data;
- m) broadcast of multimedia data;
- n) wide range of data volumes and transfer rates;
- o) access control, security;
- p) tariffing;
- q) copyright, licensing;
- r) wide range of support materials;
- s) use of a wide range of terminals and workstations, including devices with minimal resources;
- t) minimal resources: facilities that the interchange form must provide in order for a given set of objects, running in limited resources environments, to meet their functional specification as determined by the designer:
 - 1) ease of specification: for specifying the minimum recommended resources needed by an MHEG application;
 - 2) ease of application: minimum requirements of an application should be easily recognised by the negotiation process;
 - 3) flexibility: the mechanism should be reliable across a broad range of system configurations and media formats;
 - 4) informative rather than restrictive: the using application should have the final determination as to whether a given set of objects can be interpreted;
 - 5) extensible/open: the representation should function correctly as new formats, classes, and application-dependent parameters are added;
 - 6) scalability: trade-off among different application platform capabilities, for example, resolution enhancement relative to presentation time;
 - 7) composition: the minimum resource requirements for a given MHEG application should be combinable in some consistent and predictable manner when applications are combined;
 - 8) graceful degradation: the primary concern of minimal resource systems is the manner in which degradation can be handled; an application should be able to express its policy with regard to this issue, for example, by using scalability and related mechanisms;
- u) real-time interchange and presentation:
 - 1) object placement optimisation: objects that are likely to be accessed simultaneously are adjacent from the standpoint of the access mechanism;
 - 2) progressive access of objects: images may be retrieved and presented in increasing resolution for systems with significant presentation delay; scalable versions of objects may be represented and retrieved for systems with insufficient resources for full fidelity presentation;
 - 3) partial object retrieval: large objects may be retrieved in several portions, since the entire content is not presented at one time;
 - 4) object sequencing: the order in which objects are expected to be presented should be used by the access mechanism when insufficient throughput would lead to unacceptable delays for the whole object to be interchanged;
 - 5) separate retrieval of object description and object content: the object description should be retrieved without necessarily retrieving the content so that the system can use information about a set of objects to optimise the access for this set and resources needed for the access can be prepared;

- 6) global object index: a table of all objects and their position in an object set should be provided to support fast lookup of objects;
- 7) object interleaving: objects that are to be retrieved simultaneously may be interleaved so that large objects do not cause delays for other objects;
- 8) resource requirements: that for retrieval and presentation by the target system should be available by lookup rather than by derivation;
- 9) aggregate retrieval: a collection of objects can be aggregated so that they can be retrieved by one step rather than through a series of requests;
- v) ability to reference individual media objects internally and externally;
- w) ability to navigate in a hypermedia fashion;
- x) ability to support arbitrary hyperlink transversal schemes.

These requirements can be summarised in a set of generic needs:

- Application designers and vendors require application portability in a multi-vendor environment.
- Applications need handle multimedia information structured in such a way that real-time interactivity (including acquisition of multimedia data), as well as real-time interchange of multimedia data can be ensured.
- Applications need compose and synchronise multimedia data in space and time.
- Applications need be able to define links between multimedia data elements.
- Applications need be able to reuse multimedia data by integration in different contexts.
- Applications need be able to frequently update the multimedia data, as well as to manipulate a set of data elements.
- Applications need be able to be interpreted on different systems, from minimal resources to non-limited resources systems.
- Applications need be interchanged and presented in real-time.

These requirements have been taken into account in defining the standard for multimedia and hypermedia information.

0.3 Rationale for standardisation of multimedia and hypermedia information

The rationale for a standard defining multimedia and hypermedia information structures is based on the following considerations.

- Standardisation only at the level of monomedia information is not sufficient to guarantee application portability. Applications do not use the monomedia data separately but must define an associated set of parameters that are necessary for presentation. (Such parameters may include identification of the encoding algorithm applied to the data, decoding parameters relevant to the data, optional attributes to be used for presentation).
- Standardisation only at the level of monomedia information is not sufficient for the design and interchange of multimedia and hypermedia information. Multimedia and hypermedia applications rely on abstractions or data structures that provide features such as synchronisation links and logical links between monomedia data.
- The design and management of multimedia and hypermedia applications in distributed environments is eased if the internal details of the information presentation are masked from the application by the use of appropriate abstractions. The application should deal only with functions such as management of information distribution, scheduling of presentation, management of the user dialogue, and other high-level activities.

This part of ISO/IEC 13522 aims to provide generic multimedia/hypermedia information structures that fulfil these requirements and additionally are suited to:

0.4.3 Minimal resources

This part of ISO/IEC 13522 supports the specification of the minimal resources required to present the encoded data and provides facilities for the interchange of information relating to these resources, which is provided by the information source.

0.4.4 Real time

This part of ISO/IEC 13522 eases the real-time interchange of multimedia information and provides facilities to assist a using system to achieve an adequate information flow.

0.5 Concepts of this part of ISO/IEC 13522

This subclause provides a general introduction to the concepts of this part of ISO/IEC 13522. The following concepts are presented:

- **MHEG classes, MHEG objects:** this part of ISO/IEC 13522 defines object classes. From these classes, MHEG objects may be instantiated by the object designer (e.g. a computer program) and interchanged between using applications. Any number of MHEG objects may be instantiated from a given MHEG class.
- **Run time objects (rt-objects):** The MHEG model class is an MHEG abstract class, which provides the following MHEG classes: script, content, multiplexed content, and composite classes. From these model classes, model objects may be instantiated by the object designer and interchanged. In order to reuse the data interchanged in the model objects in different contexts, the object designer can to create run-time objects, also called rt-objects, from a given model object: for example, the same data in a content object may be presented twice at the same time with different sizes using two rt-content objects, but the content object is interchanged only once. Any number of rt-objects may be created from a given model object by the object designer.
- **Channels:** this part of ISO/IEC 13522 defines logical spaces in which the rt-objects are presented and perceived by the user.

0.5.1 Object orientation

This part of ISO/IEC 13522 defines a classification of structures corresponding to units of multimedia/hypermedia information to be interchanged. This classification is based on an analysis of the common behaviour and properties of multimedia/hypermedia information and takes the form of an object-oriented approach to the specification. This approach results in autonomous and reusable information structures that are generic to multimedia/hypermedia applications.

In the context of this part of ISO/IEC 13522, the term "class" denotes a structure of interchangeable multimedia/hypermedia information from which MHEG objects can be instantiated. This part of ISO/IEC 13522 uses the object-oriented mechanism of deriving subclasses from existing ones, together with the associated concept of inheritance.

The use of an object-oriented approach for the definition of MHEG structures does not imply that a system interpreting these structures must be based upon this approach. While this part of ISO/IEC 13522 defines an interchange format for multimedia/hypermedia information, it makes no assumptions about the internal representation of MHEG structures or the design of systems, engines, interpreters, tools, or using applications.

The MHEG classes contain a level of complexity that is appropriate for use as generic structures in a wide range of using applications and domains. It is assumed that the semantics associated with the use of MHEG classes are defined at the application level and not at the level of this part of ISO/IEC 13522. When using applications interchange multimedia/hypermedia information, they usually rely on interchange services, which provide the appropriate support for the interchange of data. There are various levels of complexity of data interchange, as shown in Figure 0.2.

- real-time presentation, i.e. using multimedia presentation and synchronisation facilities available on the application platform;
- real-time interchange, i.e. using communication facilities available on the application platform;
- final-form representation, i.e. in which the information is represented and coded for direct presentation without requiring additional processing of its structure.

0.4 Objectives of this part of ISO/IEC 13522

0.4.1 Interchange

This part of ISO/IEC 13522 provides interchange facilities for various media types. The media data may be encoded according to other international standards, e.g. JPEG for still image, MPEG for video, or may be encapsulated using private or proprietary coding techniques. The interchange units defined by this part of ISO/IEC 13522 are handled by the MHEG engine under the control of a using application.

In order to support multimedia interchange, as opposed to the interchange of multiple media, this part of ISO/IEC 13522 provides structures for the composition of different media types within a single unit of interchange.

0.4.2 Presentation

This part of ISO/IEC 13522 supports final-form presentation of multiple media types. This part of ISO/IEC 13522 provides facilities for the identification of the coding technique to enable the use of the appropriate presentation resources on a specific platform.

In order to support multimedia presentation, as opposed to the presentation of multiple media, this part of ISO/IEC 13522 provides structures for the composition of different media types in a presentation. This composition takes the form of time sequencing, spatial positioning, and logical interaction among the media.

In addition, this part of ISO/IEC 13522 supports interaction with and modification of media data and its associated presentation attributes, e.g. size, position and volume.

Figure 0.1 illustrate the use of this part of ISO/IEC 13522 as an interchange unit and as an identifier of multimedia information encoded according to several International Standards.

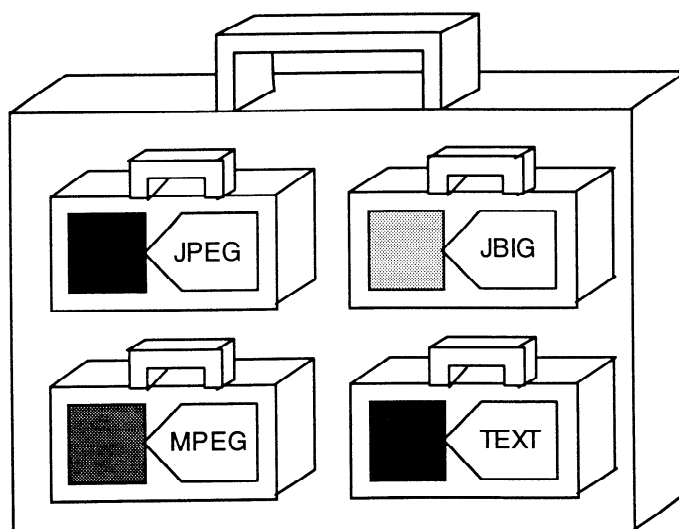


Figure 0.1 - This part of ISO/IEC 13522 for interchange and identification of multimedia information

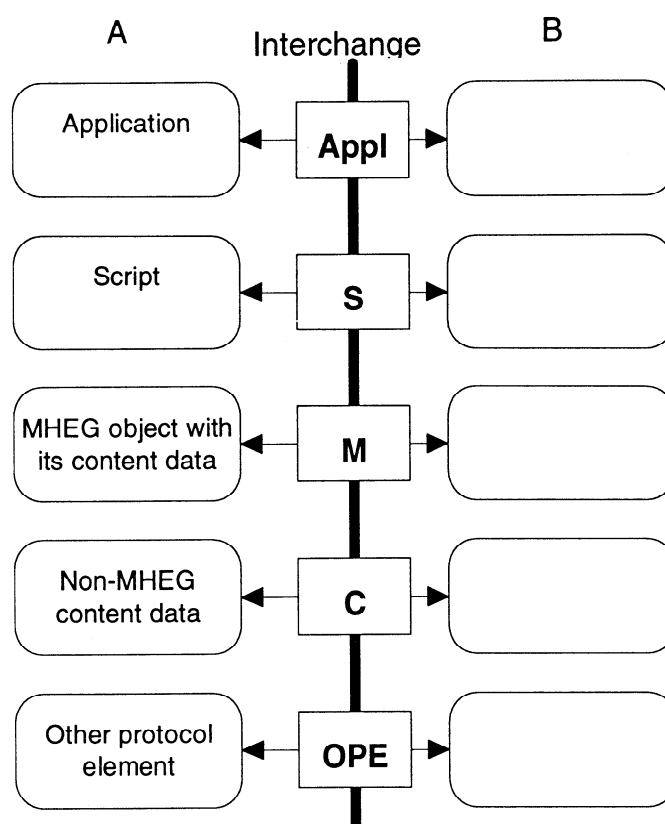


Figure 0.2 - Multimedia/hypermedia interchange model

In Figure 0.2, applications A and B may be seen as a single application by the user.

Figure 0.2 shows interchange between using applications A and B and identifies the levels at which this interchange takes place.

- Application level: This exchange (Appl) is not covered by this part of ISO/IEC 13522. The using application may make use of a script interchange standard at the next lower layer.
- Script level: This exchange (S) is covered by ISO/IEC 13522-3 and other standards for hyperdocument and scriptware interchange and may make use of the MHEG object interchange Standard at the next lower layer.
- MHEG object level: This exchange (M) is the subject of this part of ISO/IEC 13522. It makes use of recommendations and standards for the interchange of content data.
- Non-MHEG content or script data level: This exchange (C) is covered by this part of ISO/IEC 13522-3 for script data and is addressed by individual monomedia recommendations and standards for other content or script data.
- Other protocol element level: This exchange (OPE) of elements such as messages and acknowledgements is required by the application but is not addressed by this part of ISO/IEC 13522.

This model also shows the need to address the binding of the application to the MHEG objects and of MHEG objects to the content and script data.

0.5.2 Encoding

This part of ISO/IEC 13522 provides a coded representation of each MHEG class. Instances of these coded representations are MHEG objects and represent the data interchanged and presented by multimedia/hypermedia applications.

The base coded representation makes use of ISO/IEC 8824 "Specification of Abstract Syntax Notation One" (ASN.1) and ISO/IEC 8825 "Specification of Basic Encoding Rules for ASN.1" and is described in this part of this part of ISO/IEC 13522.

Alternative coded representations may be provided. Their coded representation should be isomorphic to the base-coded representation. These different notations and encoding schemes are alternatives used to express the same and unique representation of the MHEG objects.

0.5.3 Overview of the MHEG classes

The classes defined in this part of ISO/IEC 13522 can be used to specify:

- objects containing media information;
- relationship between objects;
- dynamic behaviour of objects;
- information to optimise the real-time handling of objects.

The instantiable classes described in the next subclauses are defined by this part of ISO/IEC 13522:

0.5.3.1 Content class

The content class is a model class; it encapsulates or refers to the coded representation of media information together with a parameter set containing information required for content presentation. This parameter set includes an identification of the coding method and a field for the specification of application-oriented parameters (e.g. fonts and colour table). The content class also specifies the original size, duration and volume of the data. These values are expressed using generic space and temporal units. From the content class, the multiplexed content object is derived; content objects that are not multiplexed are called pure content objects or non-mux content objects.

0.5.3.2 Multiplexed content class

The multiplexed content class is a model class that is a sub-class of the content class. It encapsulates or refers to the coded representation of multiplexed media data together with a description of each multiplexed stream.

0.5.3.3 Composite class

The composite class is a model class; it provides support for associating multimedia and hypermedia objects. This mechanism provides a consistent approach to the linking and synchronisation in time and space, of a set of objects. This class also provides a logical structure to describe the list of possible interactions offered to the user, but does not define the interaction facilities provided by the user interface. Such interaction may be achieved in a variety of ways, e.g. graphical user interface and keyboard. This part of ISO/IEC 13522 does not define the look and feel of multimedia interactive presentations, nor does it propose to change or add concepts to those existing in typical graphical user interfaces. As this part of ISO/IEC 13522 is generic and independent of platform and implementation, it describes interaction at a virtual level. It is up to a using application to apply these mechanisms using its specific look and feel.

0.5.3.4 Action class

This part of ISO/IEC 13522 provides an initial behaviour for each MHEG object, run-time object (rt-object), and channel, e.g. default position of an rt-content. It provides also a means to modify the initial behaviour of each object by defining a list of elementary actions to be applied to the objects. The modification of the behaviour is achieved by interchanging the corresponding elementary actions within action objects. The action objects are used within a link object to describe the link effect.

The action class defines a structure that specifies a synchronised set of elementary actions to be applied to one or more targets.

0.5.3.5 Elementary actions

This part of ISO/IEC 13522 defines elementary actions that can affect the following behaviours of an MHEG object, an rt-object or a channel.

- **Preparation:** Actions are provided to control the availability of MHEG object in the system. For example, the Prepare and Destroy actions may be applied to add and remove an MHEG object from the system.
- **Creation of run-time objects (rt-objects):** The New action is provided to create rt-objects (rt-script, rt-component) from a model object (script, component); the Delete action is provided to destroy rt_objects.
- **Presentation:** Actions are provided to control the progress of rt-components in the system. For example, the Run and Stop actions may be applied to control the progression of a time-based rt-component.
- **Rendition:** Actions are provided to control the projection of an rt-component on to the system. These actions vary according to the media type. For example, the Set GTF action changes the presentation speed for time-based media and Set OVS action changes the presentation size for visible media.
- **Interaction:** Actions are provided to control the results of interaction with an rt-component in the system. For example, Set Interaction Ability action specifies the selectability and the modifiability of an rt-component.
- **Activation:** Actions are provided to control the activation of rt-scripts in the system. For example, the Run and Stop actions.

0.5.3.6 Get actions

This part of ISO/IEC 13522 also defines a means to retrieve the behaviour of an MHEG object, an rt-object or a channel. Actions are provided to get the behaviour attribute or status value of MHEG objects, rt-objects and channels. These actions are called "get actions". The result of a get action is either a generic value or the value "undefined" when an error condition occurs. The get actions are used to express the source and the comparison value of the link condition in a link object or as any parameter of an elementary action.

0.5.3.7 Link class

The link class defines a structure that specifies a set of relationships. Each relationship is defined between one or more sources and one or more targets. The relationship is composed of conditions associated with the sources (link condition) and actions to be applied to the targets (link effect). The actions, which are described in action objects, are to be applied to the targets when the conditions are satisfied.

The source and targets can be instances of any MHEG class, including link class and action class. The source and targets can also be any run-time objects.

Instances of the link class are used to specify the time sequencing, spatial positioning, or logical interaction between MHEG objects and run-time objects.

0.5.3.8 Script class

The script class is a model class. It defines a container for complex relationships between MHEG objects, run-time objects and channels, specified in a script representation. This part of ISO/IEC 13522 does not define the script representation itself but provides the script class to encapsulate a script and an indication of the representation used.

It is assumed that the script representation used in a script object is able to reference MHEG objects, rt-objects, and channels, and also to access their attributes. This part of ISO/IEC 13522-3 defines an interface to MHEG entities for this purpose and defines a script interchange format.

0.5.3.9 Descriptor class

The descriptor class defines a structure for the interchange of resource information about one or several other interchanged objects. The described objects are called "related" objects. The information can be used to facilitate matching between the resources required to present the objects and the resources available to the system, or to perform a negotiation between the source of the MHEG objects and the presentation site.

0.5.3.10 Container class

The container class provides a means to group multimedia and hypermedia data in order to interchange them as a whole set.

0.5.4 Run-time objects (rt-objects)

For the purpose of reusing model objects (script, component objects) in different presentations or activations, a clear separation is made between the interchanged model object, which contains the reusable data or composition, and the rt-object corresponding to a specific view of the model data or composition.

The rt-objects (rt-script, rt-content, rt-multiplexed content, and rt-composite objects) are created by the object designer using the MHEG action New. The presentation or activation of an rt-object does not affect the model object; this allows reuse of same model object in different rt-objects.

0.5.5 Channels

A channel is a logical space in which the rt-components (rt-content and rt-composite objects) are presented and perceived by the user. The channels are created by the object designer using an MHEG action. The object designer may provide information in the descriptor object to help the MHEG engine map of the logical channels to the real world.

0.6 The MHEG application interface

This part of ISO/IEC 13522 does not define an Application Programming Interface (API) for the handling of objects in a system. However, it is assumed that the MHEG engine provides the using application with the way to use the actions defined in ISO/IEC 13522-1.

0.7 Extensibility of this part of ISO/IEC 13522

The scope of the classes defined in this part of ISO/IEC 13522 is compatible with their use in a wide range of applications and domains. It is recognised that certain applications may require specific functionality not directly provided by the classes, e.g. a using application may require the use of specialised resources available on a given platform. In this case, additional resources, which are not provided directly by this part of ISO/IEC 13522, may be associated with the MHEG objects. This association is defined using one of the following techniques, whose use does not impact the coded representation of the facilities defined by this part of ISO/IEC 13522.

The following provisions may be extended (see clause 15):

- extension of elementary actions;
- extension of attributes of an MHEG object, an rt-object or a channel;
- extension of data types, classifications, styles, events, channel media types;
- addition of new object classes.

NOTE: This facility may be used for example to create and manipulate new attributes such as payment or colour, or to vary some speech modulation parameter in an audio object.

For 1) through 3), a registration procedure and catalogues are provided by the part 4 of this part of ISO/IEC 13522. This may be used to define extensions without significant reduction of portability. This extension allows users to use proprietary or registered catalogues (see clause 14 and 15.1). An MHEG engine may take any catalogue entry into account and thereby introduces the new extension process; another MHEG engine with no extensions may ignore the extension.

The addition of new object classes implies an appropriate adaptation of MHEG engine for interpretation of the new classes, which limits the usage of MHEG objects of these classes to that MHEG adapted engine.

0.8 Liaisons

This part of ISO/IEC 13522 interfaces with a variety of multimedia applications and is consistent with other International Standards and recommendations developed in ISO and ITU-T.

ISO/IEC JTC1/SC29/WG12 maintains active liaison with those working groups of ISO and ITU-T who are engaged in multimedia/hypermedia standardisation. See the foreword for further details.

Information technology - Coding of multimedia and hypermedia information -

Part 1:

MHEG object representation - Base notation (ASN.1)

1 Scope

This part of ISO/IEC 13522 specifies the coded representation of final-form multimedia and hypermedia information objects that are interchanged as units within or across services and applications, by any means of interchange (e.g. storage, local area network, wide area telecommunication, broadcast telecommunications or broadcast networks). These objects, called MHEG objects, define the structure of a multimedia presentation.

These objects provide the following functionalities:

- final-form representation,
- systems with minimal resources,
- interactivity and multimedia synchronisation,
- real-time presentation,
- real-time interchange,

as a common base for many multimedia and hypermedia applications.

This part of ISO/IEC 13522 defines:

- the specifications of the MHEG objects without regard for the underlying representation coded representation,
- the base-coded representation, using the ASN-1 representation.

(Other types of coded representation may be specified in other parts of ISO/IEC 13522.)

1.1 Specificity of the scope

Since it is expected that a wide range of recommendations, standards, and using applications will be users of this part of ISO/IEC 13522, the scope focuses on the generic structuring aspects. This part of ISO/IEC 13522 recognises the semantics implied by the specification of the MHEG objects but does not enforce any semantic interpretation by the using application.

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 make use of MHEG objects. Integration of MHEG objects within these models, services, systems, protocols or applications, or interworking, may be defined by other standards.

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

2 Conformance

The conformance is evaluated on interchanged objects. There is no consideration of conformance for a system, an engine or a process.

An interchanged object is conformant if it can be correctly interpreted. This means that:

- its ASN.1 encoding is correct (conformance of the concrete syntax);
- its ASN.1 notation is conformant to the grammar specified in this part of ISO/IEC 13522 (conformance of the abstract syntax).

A conforming MHEG decoder shall recognise and decode all MHEG objects as defined in this part of ISO/IEC 13522.

2.1 Profiles

Profiles may be provided by other parts of ISO/IEC 13522 or the using applications.

2.2 Syntax

Conformance is on the base representation. An MHEG object instance shall be represented using the ASN.1 notation defined by this part of ISO/IEC 13522.

Conformance at the level of the coded representation is ensured by the use of ISO/IEC 8825-1 for the encoding of the syntax.

2.3 Semantics

This part of ISO/IEC 13522 provides an encoded representation for expressing an expected behaviour of objects, such as relationship in time and space, but does not define techniques to handle such relationships among the objects.

3 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 are 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 IEC and ISO maintain registers of currently valid International Standards.

- ISO/IEC 8824-1:1994, *Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation*. (Corresponds to ITU-T Rec. X.680.)
- ISO/IEC 8824-1:1995 Amd.1:1996, *Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation - Amendment 1: Rules of extensibility*. (Corresponds to ITU-T Rec. X.680/Amd.1.)
- ISO/IEC 8824-2:1995, *Information technology - Abstract Syntax Notation One (ASN.1): Information object specification*. (Corresponds to ITU-T Rec. X.681.)

- ISO/IEC 8824-2:1995 Amd.1:1996, *Information technology - Abstract Syntax Notation One (ASN.1): Information object specification - Amendment 1: Rules of extensibility*. (Corresponds to ITU-T Rec. X.681/Amd.1.)
- ISO/IEC 8825-1:1995, *Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*. (Corresponds to ITU-T Rec. X.690.)
- ISO 8879:1986, *Information processing - Text and office systems - Standard Generalized Markup Language (SGML)*.
- ISO/IEC 9070:1991, *Information technology - SGML support facilities - Registration procedures for public text owner identifiers*.
- ISO/IEC TR 9573:1988, *Information processing - SGML support facilities - Techniques for using SGML*.