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**Information technology — MPEG  
systems technologies —**

**Part 4:  
Codec configuration representation**

*Technologies de l'information — Technologies des systèmes MPEG —  
Partie 4: Représentation de configuration codec*





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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This fourth edition cancels and replaces the third edition (ISO/IEC 23001-4:2014), which constitutes a minor revision with the following changes:

- addition of citations to [Annexes G, H and I](#) in the Introduction;
- addition of a citation to [Annex E](#) in [Clause 4](#);
- improvement of the usage description of `rvc:port` attribute and addition of a citation to [Annex F](#) in [Clause 6](#);
- improvement of the specification of RVC-BSDL in [Annex C](#);
- addition of informative description of a generic bitstream parser in [Annex I](#).

A list of all parts in the ISO/IEC 23001 series can be found on the ISO website.

## Introduction

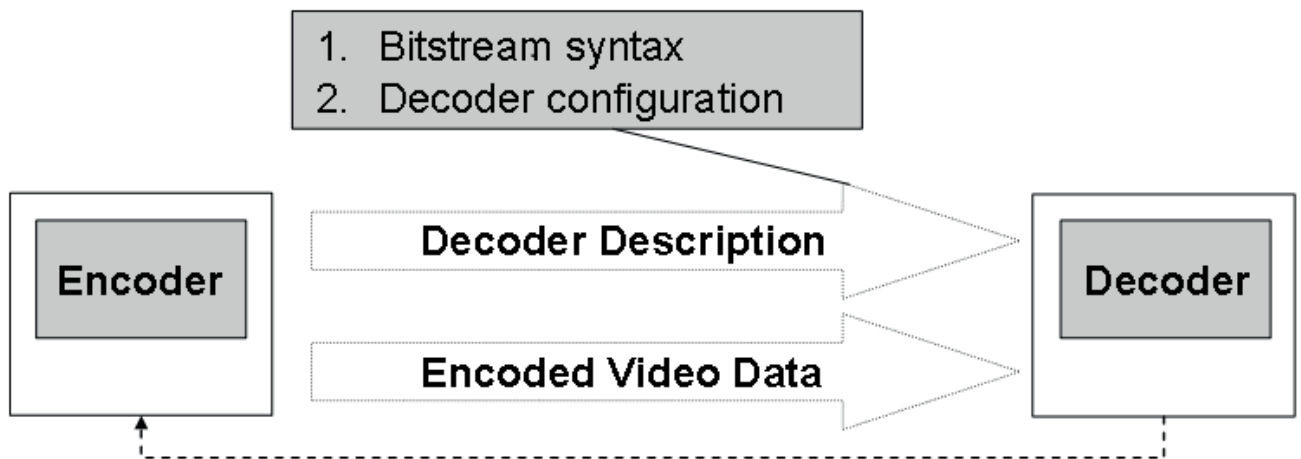
This document defines the methods capable of describing codec configurations in the reconfigurable video coding (RVC) framework. The objective of RVC is to offer a framework that is capable of configuring and specifying video codecs as a collection of “higher level” modules by using video coding tools. The video coding tools are defined in the video tool library. ISO/IEC 23002-4 defines the MPEG video tool library. The RVC framework principle could also support non-MPEG tool libraries, provided that their developers have taken care to obey the appropriate rules of operation.

For the purpose of framework deployment, an appropriate description is needed to describe configurations of decoders composed of or instantiated from a subset of video tools from either one or more libraries. As illustrated in [Figure 1](#), the configuration information consists of

- bitstream syntax description, and
- network of functional units (FUs) description (also referred to as the decoder configuration)

that together constitute the entire decoder description (DD).

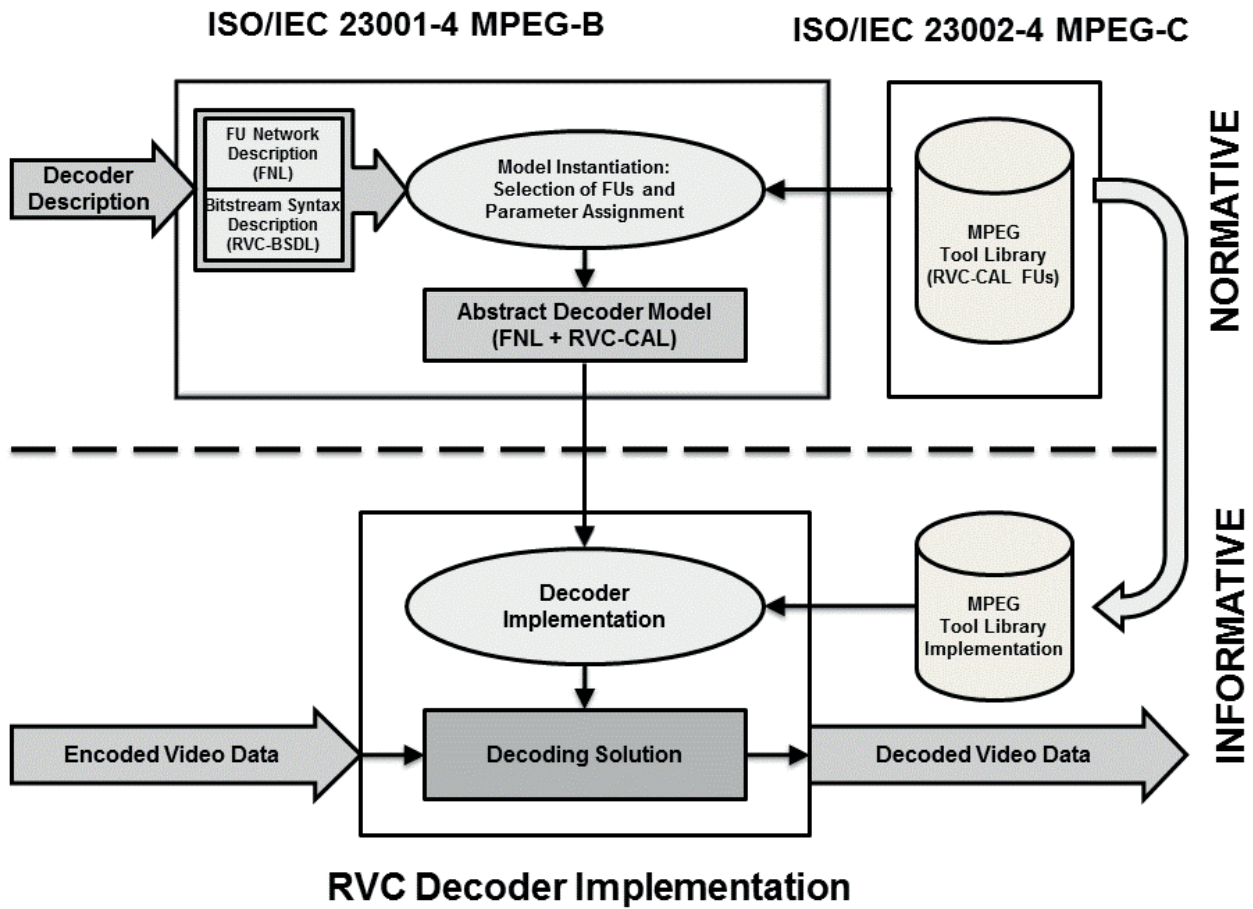
Bitstreams of existing MPEG standards are specified by specific syntax structures and decoders are composed of various coding tools. Therefore, RVC includes support for bitstream syntax descriptions, as well as video coding tools. As depicted in [Figure 1](#), a typical RVC decoder requires two types of information, namely the decoder description and the encoded media (e.g. video bitstreams) data.



**Figure 1 — Conceptual diagram of RVC**

[Figure 2](#) illustrates a more detailed description of the RVC decoder.

A more detailed description of the RVC decoder is shown in [Figure 2](#), where the decoder description is required for the configuration of an RVC decoder. The Bitstream Syntax Description (BSD) and FU Network Description (FND) (which compose the Decoder Description) are used to configure or compose an abstract decoder model (ADM) which is instantiated through the selection of FUs from tool libraries optionally with proper parameter assignment. Such an ADM constitutes the behavioural reference model used in setting up a decoding solution under the RVC framework. The process of yielding a decoding solution may vary depending on the technologies used for the desired implementations. Examples of the instantiation of an abstract decoder model and generation of proprietary decoding solutions are given in [Annex I](#).



**Figure 2 — Graphical representation of the instantiation process or decoder composition mechanism for the RVC normative ADM and for the non-normative proprietary compliant decoder implementation**

Within the RVC framework, the decoder description describes a particular decoder configuration and consists of the FND and the BSD. The FND describes the connectivity of the network of FUs used to form a decoder whereas the parsing process for the bitstream syntax is implicitly described by the BSD. These two descriptions are specified using two standard XML-based languages or dialects:

- Functional Unit Network Language (FNL) is a language that describes the FND, known also as “network of FUs”. The FNL specified normatively within the scope of the RVC framework is provided in this document;
- Bitstream Syntax Description Language (BSDL), standardized in ISO/IEC 23001-5 (MPEG-B Part 5), describes the bitstream syntax and the parsing rules. A pertinent subset of this BSDL named RVC-BSDL is defined within the scope of the current RVC framework. This RVC-BSDL also includes possibilities for further extensions, which are necessary to provide complete description of video bitstreams. RVC-BSDL specified normatively within the scope of the RVC framework is provided in this document.

The decoder configuration specified using FNL, together with the specification of the bitstream syntax using RVC-BSDL fully specifies the ADM and provides an “executable” model of the RVC decoder description.

The instantiated ADM includes the information about the selected FUs and how they should be connected. As already mentioned, the FND with the network connection information is expressed by using FNL. Furthermore, the RVC framework specifies and uses a dataflow-oriented language called

RVC-CAL for describing FUs' behaviour. The normative specification of RVC-CAL is provided in this document. The ADM is the behavioural model that should be referred to in order to implement any RVC conformant decoder. Any RVC compliant decoding solution/implementation can be achieved by using proprietary non-normative tools and mechanisms that yield decoders that behave equivalent to the RVC ADM.

The decoder description, the MPEG video tool library, and the associated instantiation of an ADM are normative. More precisely, the ADM is intended to be normative in terms of a behavioural model. In other words, what is normative is the input/output behaviour of the complete ADM, as well as the input/output behaviour of all the FUs that are included in the ADM.

This document also includes informative technical descriptions to facilitate implementation of the RVC framework. In [Annex G](#), allocation of the decoder configuration data within MP4 file format is introduced. In [Annex H](#), carriage of the decoder configuration over RTP is described. Finally, in [Annex J](#), technical relation between the codec configuration representation and the MPEG multimedia middleware (M3W) is described.

# Information technology — MPEG systems technologies —

## Part 4: Codec configuration representation

### 1 Scope

This document defines the methods and general principles capable of describing codec configurations in the reconfigurable video coding (RVC) framework. It primarily addresses reconfigurable video aspects and will only focus on the description of representation for video codec configurations within the RVC framework.

Within the scope of the RVC framework, two languages, namely FNL and RVC-BSL, are specified normatively. FNL is a language that describes the FND, also known as "network of FUs". RVC-BSL is a pertinent subset of BSL defined in ISO/IEC 23001-5. This RVC-BSL also includes possibilities for further extensions, which are necessary to provide complete description of video bitstreams.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 14496-2:2004, *Information technology — Coding of audio-visual objects — Part 2: Visual*

ISO/IEC 14496-12, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 23001-5, *Information technology — MPEG systems technologies — Part 5: Bitstream Syntax Description Language (BSL)*

ISO/IEC 23002-4, *Information technology — MPEG video technologies — Part 4: Video tool library*

IETF RFC 1889, *RTP A Transport Protocol for Real-Time Applications*, H. Schulzrinne, et. al., January 1996

IETF RFC 2327, *SDP: Session Description Protocol*, M. Handley, April 1998