INTERNATIONAL STANDARD

ISO/IEC 23008-10

First edition
2015-04-15

Information technology — High efficiency coding and media delivery in heterogeneous environments —

Part 10: MPEG Media Transport Forward Error Correction (FEC) codes

Technologies de l'information — Codage à haute efficacité et livraison des medias dans des environnements hétérogènes —

Partie 10: Codes de correction d'erreur anticipée pour le transport des medias MPEG

Reference number
ISO/IEC 23008-10:2015(E)

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Published in Switzerland

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Foreword

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The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 23008 consists of the following parts, under the general title *Information technology — High efficiency coding and media delivery in heterogeneous environments*:

— *Part 1: MPEG media transport (MMT)*

— *Part 2: High efficiency video coding (HEVC)*

— *Part 3: 3D Audio*

— *Part 10: MPEG Media Transport Forward Error Correction (FEC) codes*

— *Part 11: MPEG Media Transport Composition Information*

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Introduction

This part of ISO/IEC 23008 specifies application level forward error correction (FEC) codes which can be used with application level-forward error correction (AL-FEC) framework of ISO/IEC 23008-1 MPEG Media Transport (MMT) to provide reliable delivery in IP network and non IP network environments that are prone to packet losses.

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Information technology — High efficiency coding and media delivery in heterogeneous environments —

Part 10: MPEG Media Transport Forward Error Correction (FEC) codes

1 Scope

This part of ISO/IEC 23008 specifies application level forward error correction (FEC) codes which can be used with AL-FEC framework of ISO/IEC 23008-1 MPEG Media Transport to provide reliable delivery in IP network and non IP network environments that are prone to packet losses.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 23008-1, *Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 1: MPEG media transport (MMT)*

IETF RFC 5170, *Low Density Parity Check (LDPC) Staircase and Triangle Forward Error Correction (FEC) Schemes, June 2008*

IETF RFC 5510, *Reed-Solomon Forward Error Correction (FEC) Schemes, April 2009*

IETF RFC 6330, *RaptorQ Forward Error Correction Scheme for Object Delivery, August 2011*

SMPTE2022-1, *Forward Error Correction for Real-Time Video/Audio Transport Over IP Networks*

3 Terms, definitions, symbols, and abbreviated terms

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

3.1 Terms and definitions

3.1.1
code rate
ratio between the number of source symbols and the number of encoding symbols

3.1.2
encoding symbol
unit of data generated by the encoding process

3.1.3
encoding symbol block
set of encoding symbols from the encoding process of a source symbol block

3.1.4
3FEC code
algorithm for encoding data such that the encoded data flow is resilient to data loss

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3.1.5
FEC payload ID
identifier that identifies the contents of a MMT packet with respect to the MMT FEC scheme

3.1.6
repair symbol
encoding symbol that is not a source symbol

3.1.7
repair symbol block
set of repair symbols which can be used to recover lost source symbols

3.1.8
source symbol
unit of data used during the encoding process

3.1.9
source symbol block
set of source symbols which is used to generate repair symbol block by FEC code

3.1.10
systematic code
any error correction code in which the source symbols are part of output encoded symbols

3.2 Symbols and abbreviated terms

For the purpose of this document, the symbols and abbreviated terms given below apply.

AL-FEC application layer (level) forward error correction

FEC forward error correction

LA layer aware

LA-FEC layer aware forward error correction

LDGM low density generator matrix

LDPC low density parity check

MMT MPEG media transport

RS Reed-Solomon

S-LDPC structured low density parity check

3.3 Conventions

The following conventions apply in this document:

— The Big Endian number representation scheme is used.

4 Overview

This part of ISO/IEC 23008 specifies application level forward error correction (FEC) codes. All codes specified in this part are systematic codes.

This specification defines six FEC code algorithms which each FEC code algorithm shall generate a repair symbol block from a source symbol block as shown in Figure 1. The source symbol block consists

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