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Marlin Adaptive Streaming Specification - Simple Profile

Version 1.0.1
Final

Source
Date

Marlin Developer Community
2015, February 10

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1 Introduction

This document describes how to use Adaptive Streaming with Marlin.

1.1 Document Organization

This document is organized as follows:

- (This) introduction, including abbreviations, definitions and references.
- MPEG DASH
- HTTP Live Streaming
- ANNEX: XML Schema for MPD Extension

1.2 Conformance Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this specification are to be interpreted as described in IETF RFC 2119 [RFC2119].

These capitalized key words are used to unambiguously specify requirements and behavior that affect the interoperability and security of implementations. When these key words are not capitalized they are meant in their natural-language sense.

All Elements of this specification are considered **Normative** unless specifically marked **Informative**. All Normative Elements are **Mandatory** to implement, except where such an element is specifically marked **OPTIONAL**. Finally, where **Normative** elements are described as **OPTIONAL**, they MAY be omitted from an implementation, but when implemented, they MUST be implemented as described.

1.3 Namespaces and Identifiers

This specification defines schemas conforming to XML Schemas [Schema] and normative text to describe the syntax and semantics of XML-encoded objects and protocol messages. In cases of disagreement between the schema documents and the schema listings in this specification the schema documents take precedence.

Note that in some cases the normative text of this specification imposes constraints beyond those indicated by the schema documents.

1.3.1 Namespaces and Notation

The following table summarizes the normative schema defined by this specification and their XML namespace URIs. These URIs MUST be used by implementations of this specification:

Prefix	XML Namespace	Description
mas:	urn:marlin:mas:1-0:services:schemas:mpd	See §4

1.4 References

1.4.1 Normative references

[8pus]	Octopus DRM Technology Platform Specifications, Version 1.0
[BBTS]	Marlin Broadband Transport Stream Specification, Version 1.1

[DASH]	ISO/IEC 23001-6, Information technology - MPEG systems technologies — Part 6: Dynamic adaptive streaming over HTTP (DASH)
[HLS]	IETF Internet Draft draft-pantos-http-live-streaming-05
[MBB]	Marlin Broadband Delivery System Specification, Version 1.2
[MCS]	Marlin – Core System Specification, Version 1.3
[MP4CENC]	ISO/IEC 23001-7 Information technology -- MPEG systems technologies -- Part 7: Common encryption in ISO base media file format files
[MS3]	Marlin – Simple Secure Streaming Specification, Version 1.0
[MURIT]	URI Templates for Marlin, Version 1.0
[OMADCF]	Open Mobile Alliance DRM Content Format Approved Version 2.1 – 14 Oct 2008 OMA-TS-DRM-DCF-V2_1-20081014-A
[OMArin]	OMArin Specification, Version 1.0
[RFC2119]	S. Bradner, Key words for use in RFCs to Indicate Requirement Levels, IETF RFC 2119, March 1997. http://www.ietf.org/rfc/rfc2119.txt .
[Schema]	XML Schema Part 1: Structures. W3C Recommendation. D. Beech, M. Maloney, N. Mendelsohn, H. Thompson. May 2001. http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/

139

140 1.4.2 Informative references

Marlin	http://www.marlin-community.com/
--------	---

141

142

143 1.5 Terms and Definitions

Marlin Content ID	As defined in [8pus] §2.2, the ID that uniquely identifies a Marlin content object
Marlin Content Key	As defined in [MCS] §1.5, the symmetric key that encrypts the payload of the Marlin content.
Marlin License	As defined in [8pus] §2.2, the consolidated form of content governance objects that are used to protect the content and associate usage rules to the protected content.

144

145

146

147 **2 MPEG DASH**

148 This section defines how to use Marlin with MPEG DASH [DASH] and its relative
 149 media container formats (ISO Base Media File Format ISO/IEC 14496-12 and
 150 MPEG-2 Transport Stream ISO/IEC 13818-1).

151 **2.1 Baseline Mode**

152 Under the baseline mode, the MPEG DASH MPD (Media Presentation Description)
 153 SHALL conform to §2.2. The media container format of the media presentation
 154 SHALL conform to either §2.3 (for ISO Base Media File Format ISO/IEC 14496-12),
 155 or Marlin Broadband Transport Stream [BBTS] (for MPEG-2 Transport Stream
 156 ISO/IEC 13818-1).

157 For the baseline mode, the schemeIdUri attribute of the <ContentProtection> element
 158 defined in §2.2 SHALL be urn:uuid:5E629AF5-38DA-4063-8977-97FFBD9902D4.
 159

160 **2.2 Extensions to Media Presentation Description**

161 This section defines the semantics of the attributes and elements within the
 162 <ContentProtection> element defined in [DASH] §5.6, which are specific for Marlin.
 163 The normative schema definition is given in Annex: XML Schema for MPD Extension.
 164

Table 1 - Semantics of ContentProtection Element

Element or Attribute Name	Use	Description
ContentProtection	0...N	Provides Marlin-specific information about the use of content protection for this Representation or Group of Representation.
@schemeIdUri	M	Provides a URI to indicate that the protection scheme is Marlin.
FormatVersion	0...1	The version number of the compliant specification.
@major	M	The major version number.
@minor	M	The minor version number.
MarlinContentIds	0...1	Contains <MarlinContentId> elements.
MarlinContentId	1...N	Contains a Marlin Content Id associated with the presentation.
MarlinBroadband	0...1	Provides information specific for Marlin BB.
SilentRightsUrl	0...1	Contains a marlin-silent-rights-url.
PreviewRightsUrl	0...1	Contains a marlin-preview-rights-url.
RightsIssuerUrl	0...1	Contains a RightsIssuerURL.
MS3	0...1	Provides information specific for MS3.
URIsAreTemplated	0...1	Indicates whether the URIs referenced in the MPD contains place holder for URI Template.
Legend: For attributes: M=Mandatory, O=Optional, OD=Optional with Default Value, CM=Conditionally Mandatory. For elements: <minOccurs>...<maxOccurs> (N=unbounded) Elements are bold ; attributes are non-bold and preceded with an @.		

165
 166

167 **2.2.1 Media Presentation Description Mapping**

168 For both of Marlin BB and MS3, in order to enable the client to locate and evaluate
169 any required license prior to the start of the presentation, the MPD MAY include one
170 or more <ContentProtection> elements, with the following child elements:

- 171 • <FormatVersion> with attributes @major and @minor, each of type
172 xsd:nonNegativeInteger. @major indicates the major version number, and
173 @minor the minor version. If this element is not present, the default is for the
174 major version to be 1 and the minor version to be 0. If present, the major
175 version SHALL always be 1, and the minor version increments to indicate
176 compatible changes. Documents compliant with this specification correspond
177 to major version 1 and minor version 0. If a MPD contains more than one
178 <ContentProtection> elements, the major and minor version in all
179 <ContentProtection> elements SHALL be identical. Note that the schema
180 allows <ContentProtection> to have child elements not defined in this version
181 of this specification. Such elements, if present, MUST be ignored.
- 182 • <MarlinContentIds> element, which includes one or more <MarlinContentId>
183 child elements, each with a text child specifying a Marlin Content ID. It
184 SHOULD be possible to obtain a Marlin License or MS3 SAS governing a
185 superset of all the content IDs associated with a single media presentation. If
186 a Representation element is contained in a Group element, this
187 <MarlinContentIds> element SHALL be present on either the Group level or
188 the Representation level, but not on both. If this element is present on the
189 Group level, it shall contain the all content IDs associated with the
190 Representations contained in that Group.

192 **2.2.1.1 With Marlin BB**

193 For Marlin BB, a <MarlinBroadband> element MAY be present as a child of the
194 <ContentProtection> element if one or more of following elements are used:

- 195 - <SilentRightsUrl> of type xs:string containing a marlin-silent-rights-url as
196 defined in [OMArin] §4.2.1
- 197 - <PreviewRightsUrl> of type xs:string containing a marlin-preview-rights-url as
198 defined in [OMArin] §4.2.2
- 199 - <RightsIssuerUrl> of type xs:string containing a RightsIssuerURL as defined in
200 [OMADCF] §5.2.1.9

201 The following is an example of <ContentProtection> element.
202

```
<ContentProtection schemeldUri="urn:uuid:5E629AF5-38DA-4063-8977-97FFBD9902D4">
  <mas:FormatVersion major="1" minor="0"/>
  <mas:MarlinContentIds>
    <mas:MarlinContentId>urn:marlin:organization:foo:contentid:001
  </mas:MarlinContentId>
</mas:MarlinContentIds>
<mas:MarlinBroadband>
  <mas:RightsIssuerUrl>https://foo.bar/123456789/</mas:RightsIssuerUrl>
</mas:MarlinBroadband>
  .....
</ContentProtection>
```

203

204 **2.2.1.2 With Marlin MS3**

205 For MS3, a <MS3> element MAY be present as a child of the <ContentProtection>
206 element if one or more of following elements are used:

- 207 • <URIsAreTemplated> of type xs:Boolean indicating, if the value is True, that
208 the URIs referenced in the MPD SHALL be resolved using the MS3 engine
209 because they MAY contain a place holder for URI Template [MURIT]. Only the
210 MS3 authenticator placeholder MAY be used in URI templates.

211

212 The following is an example of <ContentProtection> element.

```
<ContentProtection schemeldUri="urn:uuid:5E629AF5-38DA-4063-8977-
97FFBD9902D4">
  <mas:MarlinContentIds>
    <mas:MarlinContentId urn:marlin:organization:foo:contentid:001
  </mas:MarlinContentId>
</mas:MarlinContentIds>
<mas:MS3>
  <mas:URIsAreTemplated>true</mas:URIsAreTemplated>
</mas:MS3>
.....
</ContentProtection>
```

213

214 **2.3 Extensions to MP4 Common Encryption Format**

215 This section defines the Marlin specific extensions that are required to use the
216 Common Encryption scheme defined in[MP4CENC].

217 **2.3.1 Implicit Content ID Mapping**

218 Implicit mapping is used when all of the following conditions are met:

- 219 • The file is signaled to be Marlin-protected (with a method in or out of Marlin
220 scope)
- 221 • The file is protected with the 'cenc' Common Encryption protection scheme
- 222 • The file doesn't contain a MarlinKidMappingTableBox('mkid') defined in
223 §2.3.2.2

224

225 In the implicit mapping mode, the Marlin Content IDs are derived from KIDs (key
226 identifiers) by converting the 16-byte KID to a URN with the following syntax:
227 urn:marlin:kid:<KID-in-hex>

228

229 where <KID-in-hex> is the lowercase hexadecimal representation of the 16 bytes of
230 the KID.

231 Example: urn:marlin:kid:1586f237d6a6aadd992e4948297e4567

232 **2.3.2 Explicit Content ID Mapping**

233 In the explicit mapping mode, the Marlin Content IDs are mapped to KIDs using a
234 mapping table. The mapping table is included in a MarlinKidMappingTableBox
235 ('mkid'), child of a Protection System Specific Header box ('pssh') included in the
236 Movie ('moov') and/or Movie Fragment ('moof').

237

238 The SystemID UUID for the Protection System Specific Header box is 69F908AF-
239 4816-46EA-910C-CD5DCCCB0A3A. This box contains a
240 MarlinSystemSpecificHeaderBox.

241 **2.3.2.1 MarlinSystemSpecificHeaderBox**

242 Box Type: 'marl'

243 Container: The Data field of the Protection System Specific Header box

244 Mandatory: Yes

245 Quantity: One

246

```
247 aligned(8) class MarlinSystemSpecificHeaderBox extends
```

```
248 Box('marl')
```

```
249 {
```

```
250 }
```

251 **2.3.2.2 MarlinKidMappingTableBox**

252 Box Type: 'mkid'

253 Container: Marlin System Specific Header box ('marl')

254 Mandatory: No

255 Quantity: Zero or one

256

```
257 aligned(8) class MarlinKidMappingTableBox extends
```

```
258 FullBox('mkid', 0, 0) {
```

```
259     unsigned int(32) entry_count;
```

```
260     for (i = 1; i <= entry_count; i++)
```

```
261     {
```

```
262         unsigned int(32) entry_size;
```

```
263         unsigned int(8)[16] KID;
```

```
264         unsigned char(8) content_id[];
```

```
265     }
```

```
266 }
```

267

268 entry_size is the size of the following KID and content_id in bytes

269 entry_count is the number of mapping entries

270 KID is a 16-byte key identifier

271 content_id is the Marlin Content ID associated with the preceding key identifier,

272 encoded using UTF-8, and no null-termination.

273

274

275 **3 HTTP Live Streaming**

276 This section defines how to use Marlin with HTTP Live Streaming [HLS].
277 Two variants are defined here: bulk encryption and packet encryption (BBTS). In
278 addition, this protocol can be used in combination with MS3 [MS3] or Marlin
279 Broadband [MBB].
280 EXT-X-KEY parameters defined in following sections SHALL be present at a top level
281 playlist so that these parameters also apply to subsequent child playlists.

282 **3.1 Bulk Encryption**

283 In this variant, the encryption of the segments is performed according to the method
284 defined in [HLS].

285 The standard EXT-X-KEY parameters apply:

286

- 287 • METHOD=AES-128 (MANDATORY) as specified in [HLS], §3.2.3
- 288 • IV (OPTIONAL) as specified in [HLS], §5.2
- 289 • CID="<ContentId>" (MANDATORY) content identifier for the content

290

291 In this case, the URI parameter is URI="urn:marlin-drm" (MANDATORY) indicating
292 that the key is protected by the Marlin DRM (BB or MS3).

293 **3.2 Packet Encryption**

294 In this variant, the encryption of the segments is performed according to [BBTS]

295 The following EXT-X-KEY parameters apply:

296

- 297 • METHOD=MARLIN-BBTS (MANDATORY)
- 298 • CID="<ContentId>" (MANDATORY) content identifier for the content

299 **3.3 Usage with MS3**

300 When used with MS3, the following additional EXT-X-KEY parameter MAY be added:

- 301 - A URIS-ARE-TEMPLATED parameter MAY be added as a parameter of the EXT-
302 X-KEY-TAG. Possible values for this parameter are TRUE or FALSE. If the
303 value is TRUE, the URIs referenced in the Playlist (and child playlists) SHALL
304 be resolved using the MS3 engine because they MAY contain an
305 {s:authenticator} place holder.

306 **3.4 Usage with Marlin BB**

307 When used with Marlin Broadband, the following additional EXT-X-KEY parameters
308 MAY be added:

- 309 - SILENT-RIGHTS-URL="<SilentRightsUrl>" (OPTIONAL) Url for Silent Rights
310 Acquisition
- 311 - PREVIEW-RIGHTS-URL="<PreviewRightsUrl>" (OPTIONAL) Url for Preview
312 Rights Acquisition
- 313 - RIGHTS-ISSUER-URL="<RightsIssuerUrl>" (OPTIONAL) Url for the Rights Issuer

314

4 Annex: XML Schema for MPD Extension

```

<?xml version="1.0" encoding="UTF-8"?>
<!--

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http://www.marlin-trust.com/

-->
<xsd:schema xmlns="urn:marlin:mas:1-0:services:schemas:mpd"
targetNamespace="urn:marlin:mas:1-0:services:schemas:mpd"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified">

  <!-- FormatVersion -->
  <xsd:element name="FormatVersion" type="FormatVersionType"/>
  <xsd:complexType name="FormatVersionType">
    <xsd:attribute name="major" type="xsd:nonNegativeInteger"/>
    <xsd:attribute name="minor" type="xsd:nonNegativeInteger"/>
  </xsd:complexType>

  <!-- MarlinContentIds -->
  <xsd:element name="MarlinContentId" type="xsd:string"/>

```

```

<!-- MarlinContentIds -->
<xsd:element name="MarlinContentIds" type="MarlinContentIdsType"/>
<xsd:complexType name="MarlinContentIdsType">
  <xsd:sequence>
    <xsd:element ref="MarlinContentId" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<!-- URIsAreTemplated -->
<xsd:element name="URIsAreTemplated" type="xsd:boolean"/>

<!-- SilentRightsUrl -->
<xsd:element name="SilentRightsUrl" type="xsd:string"/>

<!-- PreviewRightsUrl -->
<xsd:element name="PreviewRightsUrl" type="xsd:string"/>

<!-- RightsIssuerUrl -->
<xsd:element name="RightsIssuerUrl" type="xsd:string"/>

<!-- MarlinBroadband -->
<xsd:element name="MarlinBroadband" type="MarlinBroadbandType"/>
<xsd:complexType name="MarlinBroadbandType">
  <xsd:sequence>
    <xsd:element ref="SilentRightsUrl" minOccurs="0"/>
    <xsd:element ref="PreviewRightsUrl" minOccurs="0"/>
    <xsd:element ref="RightsIssuerUrl" minOccurs="0"/>
  </xsd:sequence>
</xsd:complexType>

<!-- MS3 -->
<xsd:element name="MS3" type="MS3Type"/>
<xsd:complexType name="MS3Type">
  <xsd:sequence>
    <xsd:element ref="URIsAreTemplated" minOccurs="0"/>
  </xsd:sequence>
</xsd:complexType>

</xsd:schema>

```

316