

SMPTE STANDARD



D-Cinema Operations – Extended Facility List Message

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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

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Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Engineering Document. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this document.

To issue D-Cinema Packages and corresponding Key Delivery Messages, it is necessary to collect information on the devices present at the target exhibition facility, e.g. digital certificates, 3D capabilities, etc. SMPTE ST 430-7:2008, which specifies a Facility List Message (FLM) structure for this purpose, has been superseded in practice by ad-hoc solutions. This document updates SMPTE ST 430-7:2008 to specify an Extended FLM structure, which builds on the latter.

As depicted in Figure 1, each Extended FLM instance contains information on a single facility, which houses multiple auditoriums and devices. Devices can be associated with either the facility as a whole or with each auditorium individually, where they are grouped into playback suites. Multiple components – software, hardware and firmware – can be associated with each device.

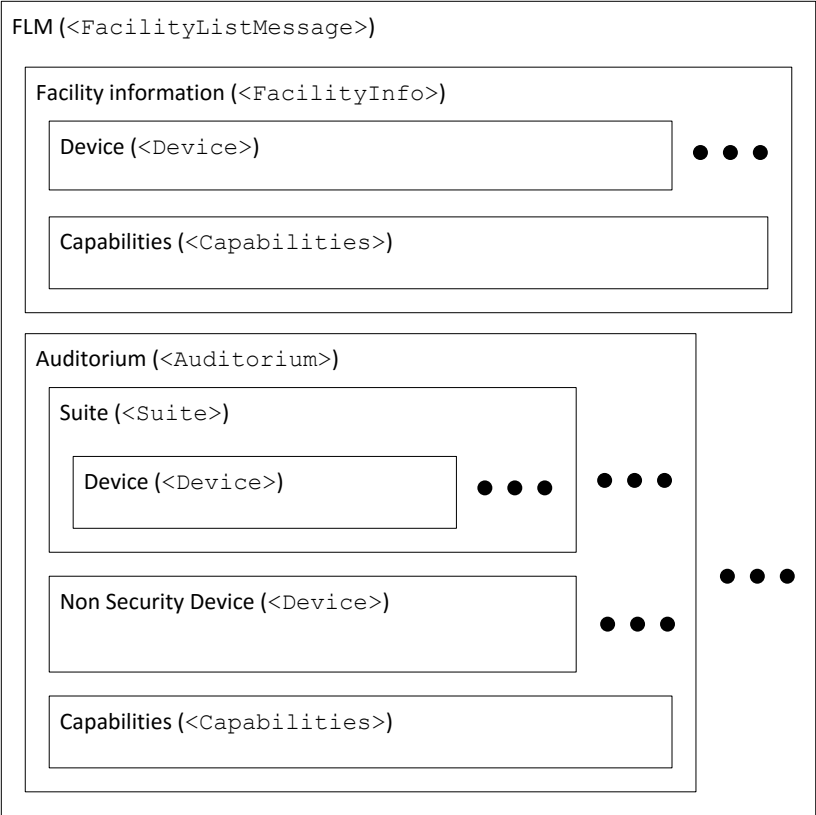


Figure 1: Extended Facility List Message Structure

Specific capabilities, e.g. 3D playback, can be associated with facilities, auditoriums and devices. This allows, for instance, a capability enabled by the combination of multiple devices to be associated with an auditorium. This specification defines a number of capabilities, and allows other specifications to easily define additional capabilities as needed.

1 Scope

This document specifies the Extended Facility List Message structure, which allows information on the equipment deployed at a D-Cinema facility to be exchanged between parties for the purpose of issuing D-Cinema Packages, as specified in SMPTE ST 429-2, and corresponding Key Delivery Messages, as specified in ST 430-1.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; then formal languages; then figures; and then any other language forms.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this engineering document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this engineering document are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

Internet Assigned Numbers Authority (1987). Eggert, P. and A. Olson, "Sources for Time Zone and Daylight Saving Time Data" (<ftp://ftp.iana.org/tz/code/tz-link.htm>)

SMPTE ST 430-1:2009, D-Cinema Operations — Key Delivery Message

SMPTE ST 430-2:2006, D-Cinema Operations — Digital Certificate.

SMPTE ST 428-12:2013, D-Cinema Distribution Master – Common Audio Channels and Soundfield Groups

ITU-T Recommendation E.123 (02/2001), Notation for national and international telephone numbers, e-mail addresses and Web addresses

ISO 3166-1, Codes for the representation of names of countries and their subdivisions – Part 1: Country codes

World Wide Web Consortium (W3C) (2004, October 28). XML Schema Part 1: Structures (Second Edition).

World Wide Web Consortium (W3C) (2004, February 4). Extensible Markup Language (XML) 1.0 (Third Edition).

Internet Engineering Task Force (IETF) (2008, October). RFC 5322 Internet Message Format.

World Wide Web Consortium (W3C) (2002, February 12). XML Signature Syntax and Processing.

4 Overall

4.1 Schema

This specification uses inline XML Schema definitions, as specified in W3C XML Schema Part 1: Structures, to specify XML structures. All definitions shall belong to the XML Schema. These schema definitions shall belong to the XML Schema whose root element is listed in Table 1.

Table 1: XML Schema Root Element Definition

```
<xs:schema elementFormDefault="qualified" xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:flm="http://www.smpte-ra.org/ns/430-16/2017/FLM"
  targetNamespace="http://www.smpte-ra.org/ns/430-16/2017/FLM"
  xmlns:dcml="http://www.smpte-ra.org/schemas/433/2008/dcmlTypes/"
  xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
  <!-- schema definitions found in this document -->
</xs:schema>
```

In the event of a conflict between schema definitions and the prose, the prose shall take precedence.

Imported namespaces shall correspond to the specifications defined in Table 2.

Table 2: Imported Namespaces

Namespace	Specification
http://www.smpte-ra.org/schemas/433/2008/dcmlTypes/	SMTPE ST 433
http://www.w3.org/2000/09/xmldsig#	W3C XML Signature Syntax and Processing

NOTE: The `http://www.w3.org/2000/09/xmldsig#` namespace is imported since its `KeyInfo` element is used in the Facility List Message structure to carry the digital certificate chains associated with a device (see Section 5.9.13). The `Signature` element defined in the same namespace is not used however.

4.2 Instance

A Facility List Message instance is `FacilityListMessage` element, as specified in Table 3.

Table 3: FacilityListMessage element definition

```
<xs:element name="FacilityListMessage" type="flm:FacilityListMessageType"/>
```

4.3 FLM Document

An FLM Document is an XML document whose root is a Facility List Message instance.

An FLM Document shall use UTF-8 encoding, as specified in W3C Extensible Markup Language (XML).

5 Structure

5.1 General

To avoid duplication between text and schema, the cardinality and default values of elements are specified in the XML schema definitions only.

5.2 FacilityListMessageType

5.2.1 General

The `FacilityListMessageType` type shall be as specified in Table 4.

Table 4: `FacilityListMessageType` schema definition

```
<xs:complexType name="FacilityListMessageType">
  <xs:sequence>
    <xs:element name="MessageId" type="dcml:UUIDType"/>
    <xs:element name="IssueDate" type="xs:dateTime"/>
    <xs:element name="AnnotationText" type="dcml:UserTextType" minOccurs="0"/>
    <xs:element name="FacilityInfo" type="flm:FacilityInfoType"/>
    <xs:element name="AuditoriumList">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="Auditorium" type="flm:AuditoriumType"
            maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
      <xs:unique name="AuditoriumNumberOrNameUnique">
        <xs:selector xpath="flm:Auditorium"/>
        <xs:field xpath="flm:AuditoriumNumberOrName"/>
      </xs:unique>
    </xs:element>
    <xs:element name="Extensions" minOccurs="0">
      <xs:complexType>
        <xs:sequence>
          <xs:any namespace="##other" processContents="lax"
            maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

5.2.2 MessageId

The `MessageId` element shall uniquely identify the Facility List Message instance.

Any two Facility List Message instances may have identical `MessageId` values if and only if the two instances are identical.

5.2.3 IssueDate

The `IssueDate` element shall indicate the time and date at which the Facility List Message was issued.

5.2.4 AnnotationText

The AnnotationText element shall be a free-form annotation associated with the Facility List Message instance. It is intended for display to the user.

5.2.5 FacilityInfo

The FacilityInfo element shall describe the facility.

5.2.6 AuditoriumList

Each Auditorium element within the AuditoriumList element shall be associated with a single auditorium within the facility. The auditorium should be for current or anticipated D-Cinema use.

5.2.7 Extensions

Extensions elements containing information intrinsic to the message, and not specifically to the facility and its components, should be added in the Extensions element.

Implementations may ignore children element of Extensions.

5.3 FacilityInfoType

5.3.1 General

The FacilityInfoType type shall be as specified in Table 5.

Table 5: FacilityInfoType Schema Definition

<pre><xs:complexType name="FacilityInfoType"> <xs:sequence> <xs:element name="FacilityID" type="xs:anyURI"/> <xs:element name="AlternateFacilityIDList" minOccurs="0"> <xs:complexType> <xs:sequence maxOccurs="unbounded"> <xs:element name="AlternateFacilityID" type="xs:anyURI"/> </xs:sequence> </xs:complexType> </xs:element> <xs:element name="FacilityName" type="dcml:UserTextType"/> <xs:element name="FacilityTimeZone" type="xs:string" minOccurs="0"/> <xs:element name="Circuit" type="dcml:UserTextType"/> <xs:element name="ContactList" minOccurs="0"> <xs:complexType> <xs:sequence> <xs:element name="Contact" type="flm:ContactType" maxOccurs="unbounded"/> </xs:sequence> </xs:complexType> </xs:element> <xs:element name="AddressList" type="flm:AddressListType"/> <xs:element name="DeviceList" minOccurs="0"> <xs:complexType> <xs:sequence> <xs:element name="Device" type="flm:DeviceType"/> </xs:sequence> </xs:complexType> </xs:element> </xs:sequence> </xs:complexType></pre>
--

```

<xs:element name="Capabilities" type="flm:FacilityCapabilitiesType"
  minOccurs="0"/>
<xs:any namespace="##other" processContents="lax" minOccurs="0"
  maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>

```

Extensions elements containing information intrinsic to the facility and generally applicable to all facilities should be added using the `any` extension point.

Extension elements describing capabilities offered by individual devices should be added to the `Capabilities` element.

Implementations may ignore extension elements.

5.3.2 FacilityID

The `FacilityID` element shall uniquely identify the facility across Facility List Message instances.

5.3.3 AlternateFacilityIDList

Each `AlternateFacilityID` element of the `AlternateFacilityIDList` element shall uniquely identify the facility.

Members of the `AlternateFacilityIDList` element may change across Facility List Message instances targeted at the same facility.

5.3.4 FacilityName

The `FacilityName` element shall be the name of the facility.

5.3.5 FacilityTimeZone

The `FacilityTimeZone` element shall be the time zone of the facility and shall be a TZ name as specified in the IANA Sources for Time Zone and Daylight Saving Time Data.

The `FacilityTimeZone` element should be present.

NOTE: Unless this element is present, the time window of a Key Delivery Message, as specified in SMPTE ST 430-1, targeted to the facility cannot be authored accurately.

5.3.6 Circuit

The `Circuit` element shall be the name of the circuit to which the facility belongs.

5.3.7 ContactList

The `ContactList` element provides information on how to contact personnel at the facility. Each `Contact` element of the `ContactList` element shall be a point of contact associated with the facility. `Contact` element should be listed in order of decreasing preference.

5.3.8 AddressList

Each element of the `AddressList` element shall be an address associated with the facility.

5.3.9 DeviceList

Each `Device` element shall correspond to a device associated with the facility as a whole, i.e. as opposed to a single auditorium.

EXAMPLE: A satellite catcher can be listed as a member of this element.

5.3.10 Capabilities

The `Capabilities` element shall indicate capabilities associated with the facility as a whole.

5.4 FacilityCapabilitiesType

5.4.1 General

The `FacilityCapabilitiesType` shall be as defined Table 6.

Table 6: FacilityCapabilitiesType Schema Definition

```
<xs:complexType name="FacilityCapabilitiesType">
  <xs:sequence>
    <xs:element name="KDMDeliveryMethodList" minOccurs="0">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="DeliveryMethod" type="flm:DeliveryMethodType"
            minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="DCPDeliveryMethodList" minOccurs="0">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="DeliveryMethod" type="flm:DeliveryMethodType"
            minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
      maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>
```

Additional capabilities associated with a facility may be introduced by adding extension elements using the `any` extension point.

Implementations may ignore extension elements they do not recognize.

5.4.2 KDMDeliveryMethodList

Each `DeliveryMethod` element of the `KDMDeliveryMethodList` element shall indicate a method by which a Key Delivery Message may be delivered to the facility

5.4.3 DCPDeliveryMethodList

Each `DeliveryMethod` element of the `DCPDeliveryMethodList` element shall indicate a method by which a D-Cinema Package may be delivered to the facility.

5.5 AuditoriumType

5.5.1 General

The schema for the `AuditoriumType` is shown in Table 7.

Table 7: AuditoriumType Schema Definition

```
<xs:complexType name="AuditoriumType">
  <xs:sequence>
    <xs:element name="AuditoriumNumberOrName" type="xs:string"/>
    <xs:element name="AuditoriumInstallDate" type="xs:date" minOccurs="0"/>
    <xs:element minOccurs="0" name="ScreenWidth">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="xs:positiveInteger">
            <xs:attribute name="units" type="flm:LengthUnitEnum" use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
    <xs:element minOccurs="0" name="SeatingCapacity" type="xs:positiveInteger"/>
    <xs:element name="SuiteList" minOccurs="0">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="Suite" type="flm:SuiteType" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="NonSecurityDeviceList" minOccurs="0">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="Device" type="flm:DeviceType" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="Capabilities" type="flm:AuditoriumCapabilitiesType"
      minOccurs="0"/>
    <xs:any namespace="##other" processContents="lax" minOccurs="0"
      maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>
```

Extensions elements containing information intrinsic to the auditoriums and generally applicable to any auditorium should be added using the `any` extension point.

Extension elements describing capabilities offered by auditorium should be added to the `Capabilities` element.

Implementations may ignore extension elements.

5.5.2 AuditoriumNumberOrName

The `AuditoriumNumberOrName` element shall be the unique and persistent number or name of the auditorium across Facility List Message instances.

5.5.3 AuditoriumInstallDate

The `AuditoriumInstallDate` element shall indicate when the auditorium became, or will become, available for D-Cinema service, i.e. consumer viewing of digitally-projected motion picture content.

NOTE: For testing, KDMs can be issued for auditoriums not yet in service.

5.5.4 ScreenWidth

The `ScreenWidth` element shall be the width of the auditorium's screen with masking fully open.

The `units` attribute shall indicate the units of measure of the `ScreenWidth` value.

5.5.5 SeatingCapacity

The `SeatingCapacity` element shall be the seating capacity of the auditorium.

5.5.6 SuiteList

Each `Suite` element of the `SuiteList` element shall correspond to an equipment suite associated with the auditorium.

5.5.7 Capabilities

The `Capabilities` element shall indicate capabilities associated with the auditorium as a whole.

...