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# **ATSC Candidate Standard: Programming Metadata Communication Protocol Standard, Revision A**

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The Advanced Television Systems Committee, Inc., is an international, non-profit organization developing voluntary standards for digital television. The ATSC member organizations represent the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries.

Specifically, ATSC is working to coordinate television standards among different communications media focusing on digital television, interactive systems, and broadband multimedia communications. ATSC is also developing digital television implementation strategies and presenting educational seminars on the ATSC standards.

ATSC was formed in 1982 by the member organizations of the Joint Committee on InterSociety Coordination (JCIC): the Electronic Industries Association (EIA), the Institute of Electrical and Electronic Engineers (IEEE), the National Association of Broadcasters (NAB), the National Cable Television Association (NCTA), and the Society of Motion Picture and Television Engineers (SMPTE). Currently, there are approximately 140 members representing the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries.

ATSC Digital TV Standards include digital high definition television (HDTV), standard definition television (SDTV), data broadcasting, multichannel surround-sound audio, and satellite direct-to-home broadcasting.

### **About the Candidate Standard**

This specification is being put forth as a Candidate Standard by the TSG/S1 Specialist Group on PSIP Metadata Communication. ATSC members and non-members are encouraged to review and implement this specification and return comments to [cs\\_amend\\_editor@atsc.org](mailto:cs_amend_editor@atsc.org). ATSC Members can also send comments directly to the TSG/S1 Specialist Group. The ATSC believes this specification is stable. It is expected to progress to Proposed Standard within a period of time ending 12 May 2005.

## Table of Contents

<b>1. SCOPE .....</b>	<b>7</b>
1.1 Purpose	7
1.2 Extensibility	7
1.3 Application	7
1.4 Organization	7
<b>2. REFERENCES .....</b>	<b>8</b>
<b>3. DEFINITIONS .....</b>	<b>8</b>
3.1 Compliance Notation	8
3.2 Abbreviations and Terms	8
<b>4. TRANSPORT .....</b>	<b>11</b>
4.1 Transport Methods	11
4.2 File Based Transport	12
4.2.1 Common Folders	12
4.2.2 File Name	12
4.3 Connection Based Transport	12
4.3.1 TCP/IP	12
4.3.2 TCP/IP Connections	12
4.3.3 Inactive Connections	13
4.3.4 Unicast	13
4.3.5 List of Devices to Connect To	13
4.3.6 List of Devices to Accept Connections From	13
4.3.7 Initiation of Servers	13
4.3.8 Sending of Messages	13
4.3.9 Encryption	14
4.3.10 Message format	14
<b>5. XML SCHEMA DESCRIPTION .....</b>	<b>14</b>
5.1 Introduction	14
5.2 Namespace	14
5.2.1 Examples:	15
5.3 Naming Conventions	15
5.4 PMCP Messages	16
5.4.1 Message Validity	16
5.4.2 Message Type	16
5.5 Device Identification	16
5.5.1 Device Name	16
5.5.2 Device Type	16

5.6	Message Identification	17
5.6.1	Message ID	17
5.6.2	Time and Date Stamp	17
5.7	Acknowledgement	17
5.7.1	Valid	17
5.7.2	Invalid	18
5.7.3	OK	18
5.7.4	Error	18
5.7.5	Acknowledgement Timeout	18
5.7.6	Multiple Requests	18
5.8	PmcpMessage Action Attributes	18
5.9	PmcpMessage Children	19
5.9.1	PmcpReply	21
5.9.2	Transport Stream	21
5.9.3	Channel	21
5.9.4	Show	21
5.9.5	PsipEvent	22
5.9.6	PSIP Data Events	23
5.9.7	AcapService	24
5.9.8	PrivatePmcpInformation	25
5.9.9	Other Children	25
5.10	PMCP Time Messages	25
5.11	Heartbeat	25
5.11.1	Heartbeat Messages	25
5.11.2	Heartbeat Timing	25
5.11.3	Server Heartbeat Timeout	26
5.11.4	Failed Device	26
5.12	Message Priority and Conflict Management	26
<b>ANNEX A:</b>	<b>PMCP SCHEMA .....</b>	<b>27</b>
<b>ANNEX B:</b>	<b>PMCP USE CASES (INFORMATIVE) .....</b>	<b>139</b>
<b>ANNEX C:</b>	<b>PSIP METADATA SYSTEM ARCHITECTURE (INFORMATIVE) .....</b>	<b>150</b>
<b>1.</b>	<b>SYSTEM COMPONENTS.....</b>	<b>150</b>
<b>2.</b>	<b>PMCP DATA FLOW .....</b>	<b>152</b>
2.1	Program Planning and Listing Service	152
2.2	Traffic, PSIP Generator, and Automation	152
2.3	Other Sources of PSIP Information	153
2.4	Last-Minute Schedule Changes	153
<b>3.</b>	<b>STATION TIMING.....</b>	<b>153</b>
3.1	Time Reference	154

3.2 GPS Time	154
<b>4. ASSUMPTIONS.....</b>	<b>154</b>
<b>ANNEX D: PMCP WITH DATA BROADCASTING FOR ACAP (INFORMATIVE).....</b>	<b>156</b>
<b>1. SYSTEM COMPONENTS.....</b>	<b>156</b>
<b>2. THE PMCP SCHEMA EXTENDED FOR ACAP ENCAPSULATION.....</b>	<b>158</b>
<b>3. DATA CAROUSEL TYPE.....</b>	<b>159</b>
<b>4. OBJECT CAROUSEL TYPE.....</b>	<b>160</b>
<b>5. THE PMCP SCHEMA EXTENDED FOR ACAP SIGNALING.....</b>	<b>161</b>
5.1 ACAP Application Type for AIT signaling	161
5.2 Channel Type for PMT signaling	165
5.3 ACAP Encapsulation and AIT Signaling	167
<b>6. PMCP SCHEMA EXTENDED FOR DATA BROADCASTING.....</b>	<b>167</b>
<b>ANNEX E: LIST OF ELECTRONIC FILES.....</b>	<b>169</b>

## Index of Figures and Tables

<b>Figure 5.1</b> PMCP message diagram.	20
<b>Figure 5.2</b> PSIP Data Event type diagram	24
<b>Figure C1</b> PSIP metadata system.	150
<b>Figure D1</b> PSIP metadata system with ACAP.	156
<b>Figure D2</b> Encapsulation and fragmentation of BIOP messages.	159
<b>Figure D3</b> ACAP Object Carousel Type diagram.	159
<b>Figure D4</b> Data Carousel Type diagram.	160
<b>Figure D5</b> Object Carousel Type diagram.	161
<b>Figure D6</b> Representation of the contents of the AIT.	162
<b>Figure D7</b> ACAP Application Type diagram.	163
<b>Figure D8</b> Application Type diagram.	164
<b>Figure D9</b> Representation of the contents of the PMT for ACAP data broadcasting.	165
<b>Figure D10</b> Channel Type diagram for the PMT descriptor.	166
<b>Figure D11</b> ACAP Data Service Type diagram.	167
<b>Figure D12</b> The Extended PMCP Schema diagram.	168
<b>Table 5.1</b> PMCP Device Types	17

# **ATSC Candidate Standard: Programming Metadata Communication Protocol, Revision A**

## **1. SCOPE**

### **1.1 Purpose**

This standard defines a method for communicating metadata related to PSIP (program and system information protocol), including duplicate data that needs to be entered in other locations in the transport stream. Communication is based on a protocol utilizing XML message documents generated in accordance with a Programming Metadata Communication Protocol (PMCP) XML Schema defined herein.

### **1.2 Extensibility**

The first version of the PMCP standard (Schema 2.0) does not make provision for communication of metadata needed to support optional data services in the broadcast transport stream, metadata needed to support directed channel change (DCC), or metadata needed for PSIP in proposed E-VSB transmissions. These items may be addressed in future revisions to the standard.

The second release of PMCP (Schema 3.0) adds support for ATSC A/101 (ACAP) data application metadata and restructures the schema to use the modular approach described in <http://www.w3.org/TR/XMLSchema-1/#compound-schema> in section 4.2.1. All functions supported by Schema 2.0 are supported by Schema 3.0

PMCP is also capable of extension to incorporate additional metadata and transactions not directly related to PSIP.

### **1.3 Application**

PMCP communications are intended to apply to systems and equipment that affect production of PSIP tables and the digital television transport stream in studio and network centers and associated remote program planning and listing services.

### **1.4 Organization**

The document is organized as follows:

- Section 1 – Provides this general introduction.
- Section 2 – Lists reference documents.
- Section 3 – Provides definitions of terms, acronyms and abbreviations used in this document.
- Section 4 – Defines the transport mechanisms to be used for PMCP communications.
- Section 5 – Describes the PMCP XML schema and how it is used.
- Annex A – A text and graphical view of the PMCP schema.
- Annex B – Provides some informative Use Case XML documents illustrating the use of PMCP.

- Annex C – Provides an informative description of the PSIP metadata system environment in which PMCP is expected to operate.
- Annex D – Provides an informative description of the PSIP metadata system environment with ACAP support in which PMCP is expected to operate.
- Annex E – Lists the electronic files that support this standard (available from the ATSC web site).

## 2. REFERENCES

The following documents are applicable to this Standard:

- [1] W3C: Extensible Markup Language (XML) 1.0 (Second Edition), W3C Recommendation 6 October 2000, <http://www.w3.org/TR/2000/REC-xml-20001006> (*normative*)
- [2] W3C: XML Schema, W3C Recommendation, 2 May 2001, <http://www.w3.org/TR/2001/REC-xmlschema-0-20010502/> (*normative*)
- [3] ATSC: “Advanced Television Standard, A/53 Revision E”, Advanced Television Systems Committee, Washington, D.C., May 21, 2004 (*normative*)
- [4] ATSC: “Program and System Information Protocol for Terrestrial Broadcast and Cable (A/65 Revision C)”, Advanced Television Systems Committee, Washington, D.C., March 1, 2003 (*normative*)
- [5] ATSC: “Code Point Registry”, Advanced Television Systems Committee, Washington, D.C. (*informative*)
- [6] ISO 15706-2:2002 Information and documentation – International Audiovisual Number (ISAN) Amendment 1: Alternate Encodings (*normative*)
- [7] CS TSG-676 “Candidate Standard: ACAP Service Signaling and Announcement” Advanced Television Systems Committee, Washington, D.C., 14 December 2005 (*normative*)
- [8] ATSC: “ATSC Advanced Common Applications Platform (ACAP)” (A/101), Advanced Television Systems Committee, Washington, D.C., 2 August 2005 (*informative*)

## 3. DEFINITIONS

### 3.1 Compliance Notation

As used in this document, “shall” denotes a mandatory provision of this standard. “Should” denotes a provision that is recommended but not mandatory. “May” denotes a feature whose presence does not preclude compliance, and that may or may not be present at the option of the implementer.

### 3.2 Abbreviations and Terms

The following terms, acronyms and abbreviations are used in this specification:

**automation event** An entry in a **playlist** that triggers an action by an automation system to initiate playback, start a machine, switch a signal, control an effect, change a configuration, or other action that changes the content or configuration of a program output channel.



<b>attribute</b>	A qualifier on an <b>XML</b> tag that provides additional information.
<b>CDATA</b>	A predefined <b>XML</b> tag for Character DATA that says, “don't interpret these characters”, as opposed to Parsed Character Data (PCDATA), in which the normal rules of XML syntax apply.
<b>content</b>	<b>Essence</b> plus its <b>metadata</b> .
<b>contentID</b>	A label for <b>content</b> . This may take the form of a global label such as <b>ISAN</b> , or a “house number”.
<b>EPG</b>	Electronic program guide.
<b>essence</b>	Actual program material (audio, video and/or data).
<b>GPS</b>	Global Positioning System.
<b>GPS Time</b>	Time signal distributed via <b>GPS</b> comprising number of seconds elapsed since 0000 Universal Time on January 6 1980. Offset from <b>UTC</b> by an integer number of seconds (currently 13) due to leap seconds added to UTC but not to GPS time.
<b>interstitial</b>	A special kind of <b>work</b> of typically less than 5 minutes inserted between <b>program segments</b> . May comprise advertisements, promotions, or other short program material .
<b>ISAN</b>	International Standard Audiovisual Number.
<b>metadata</b>	Information about <b>essence</b> .
<b>multiplexer</b>	A device that combines MPEG-2 packets from one or more elementary streams into one or more MPEG-2 transport stream outputs containing a multiplex of packets, or that combines multiple transport streams into a system level multiplex.
<b>namespace</b>	A standard that enables the definition of a unique label for the set of element names defined by a specific <b>schema</b> . A document using that schema can be included in any other document without having a conflict between XML element names. The elements defined in the schema are then uniquely identified so that, for example, the parser can tell when an element called <name> should be interpreted according to that schema, rather than using the definition for an element called "name" in a different schema.
<b>packet identifier</b>	A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.
<b>PID</b>	See <b>packet identifier</b> .
<b>playlist</b>	Also known as the “traffic schedule”. A sequential list of <b>automation events</b> to be played back for a station output channel.
<b>program element</b>	A generic term for one of the elementary streams or other data streams that may be included in a program. For example: audio, video, data, etc.

<b>program segment</b>	Portion of a TV program as defined in the <b>traffic format</b> assigned to the program.
<b>PSIP event</b>	A defined period of time on a virtual channel with associated metadata related to a <b>show</b> .
<b>remultiplexer</b>	A packet <b>multiplexer</b> capable of combining MPEG-2 transport stream packets from one or more inputs containing a multiplex of packets into one or more MPEG-2 transport stream outputs.
<b>root</b>	The outermost element in an <b>XML</b> document that contains all other elements.
<b>schedule</b>	The binding of <b>shows</b> to <b>virtual channels</b> at particular times. A schedule is the generic name for “Television Schedule” that consists of multiple audio-video presentations carried on a channel over a period of time.
<b>schema</b>	A database-inspired method for specifying constraints on <b>XML</b> documents using an XML-based language. Since <b>schemas</b> are founded on XML, they are hierarchical, so it is easy to create an unambiguous specification and possible to determine the scope over which definitions and comments are meant to apply.
<b>show</b>	The composition of the primary <b>work</b> and <b>interstitials</b> in a single timeline suitable for broadcast.
<b>show segment</b>	A contiguous subset of a <b>show</b> identified with a single start time and end time pair referenced to the show’s timeline.
<b>Tag</b>	A piece of text that describes a unit of data, or element, in <b>XML</b> . The tag is distinguishable as <i>markup</i> , as opposed to data, because it is surrounded by angle brackets (< and >). For example, the element <Channel>My 100</Channel> has the start tag <Channel>, the end tag </Channel>, which enclose the data “100”. To treat such markup syntax as data, an entity reference or a <b>CDATA</b> section is used.
<b>TCP/IP</b>	Transport Control Protocol/Internet Protocol
<b>traffic format</b>	A defined structure that specifies for each <b>traffic system</b> the organization of a primary <b>work</b> and <b>interstitials</b> . A series of traffic formats linked together form a 24 hour broadcast log. Traffic formats are typically linked to a specific program.
<b>traffic system</b>	A management system comprising a database for tracking the sale of advertising, and the scheduling of <b>program elements</b> , advertising, promotional announcements, and other interstitial material.
<b>UTC</b>	Coordinated Universal Time, the basis for the worldwide system of time. Determined using atomic clocks and maintained by the US Naval Observatory and other laboratories around the world. Adjusted occasionally with leap seconds to maintain synchronization with the solar day based on the rotation of the earth.

<b>valid XML</b>	A valid <b>XML</b> document, in addition to being <b>well formed</b> , conforms to all the constraints imposed by a <b>Schema</b> . It does not contain any tags that are not permitted by the schema, and the order of the tags conforms to the schema's specifications.
<b>value</b>	Used in <b>XML</b> to indicate the number or characters entered for a particular parameter or variable.
<b>virtual channel</b>	The designation, usually a number, that is recognized by the user as the single entity that will provide access to a set of one or more digital elementary streams or an analog TV program. It is called "virtual" because its identification (name and number) may be defined independently from its physical location.
<b>W3C</b>	The World Wide Web Consortium ( <a href="http://www.w3c.org/">http://www.w3c.org/</a> ). The international body that governs Internet standards.
<b>well-formed</b>	An <b>XML</b> document that is syntactically correct. To determine whether or not a well-formed document is valid, a validating parser and a <b>schema</b> are required.
<b>work</b>	A completed artistic creation, produced or accomplished through the effort, activity or agency of a person or group, comprised of any combination of picture (or video) essence, sound (or audio) essence and/or data (or auxiliary) <b>essence</b> .
<b>work segment</b>	A contiguous subset of a <b>work</b> ; identified with a single start time and end time pair referenced to the work's timeline; and a defined subset of the elements of the work.
<b>XML</b>	Extensible Markup Language.
<b>XML document</b>	In general, an <b>XML</b> structure in which one or more elements can contain text intermixed with sub-elements.
<b>XML element</b>	A unit of <b>XML</b> data, delimited by tags which can enclose other elements. For example, in the <b>XML</b> structure, " <code>&lt;VirtualChannels&gt;&lt;Channel&gt;..&lt;/Channel&gt;&lt;Channel&gt;..&lt;/Channel&gt;&lt;/VirtualChannels&gt;</code> ", the <code>&lt;VirtualChannels&gt;</code> element contains two <code>&lt;Channel&gt;</code> elements
<b>XML schema</b>	The W3C schema specification for XML documents.

## 4. TRANSPORT

### 4.1 Transport Methods

The PMCP protocol may be implemented using two different transport mechanisms, File Based and Connection Based transport, depending on the users' needs. All PMCP-compliant devices shall support both mechanisms as specified in Section 4.2 and 4.3 and both methods may coexist in the same system. By agreement with the providers of all affected devices, system implementers may use other protocols, not specified herein, for communication within a system.

## 4.2 File Based Transport

File Based transfer will usually be used where large amounts of data needs to be communicated from one system to another without the need for acknowledgement, and where timing is not critical. The user will simply download a file containing the XML document from the originating device and import it into the receiving device. Alternatively, the files may be pushed or pulled to the receiving device in an automatic process.

### 4.2.1 Common Folders

Receiving devices that implement the file based transport mechanism shall utilize at least one folder where new content is placed. This folder may be on the device itself or elsewhere across any accessible network. The receiving device may automatically detect when new content is available in this folder or may periodically poll the folder for new content.

Separate folders should be used for different receiving devices since the defined file name scheme identifies the message origin but not the intended recipient.

If required there should be other folders for files that will not automatically be processed when moved to a receiving device.

### 4.2.2 File Name

The originating device shall utilize a common naming scheme for the files so that the receiving device can be set up to identify the files. The file name shall be in the format of:

“PMCPyyyyymmdd<Device>nnnnnnnnnn.xml”

where:

“yyyyymmdd” is the year, month, and day that the file was sent (using UTC clock)

<Device> is a string of up to 14 letters and digits that identifies the creator of the file uniquely in the system

“nnnnnnnnnn” is a 10-character decimal number including leading zeros

## 4.3 Connection Based Transport

Connection Based transport of PMCP requires that there be a direct network connection between the sending and receiving devices.

### 4.3.1 TCP/IP

TCP/IP protocol shall be used for communication. The server default port number shall be 3821<sup>1</sup>. Systems and devices shall have the ability of changing this port number to accommodate cases where 3821 is in conflict with something else in the facility.

### 4.3.2 TCP/IP Connections

Each device using the PMCP protocol that will receive and respond to messages shall act as a server. Each device using the protocol to initiate the sending of messages shall act as a client. Devices that plan to both send and receive messages shall act as both a server and a client.

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<sup>1</sup> Port number 3821 is also assigned to PMCP for UDP communications, in case this protocol is used in accordance with Section 4.1.

A TCP/IP connection shall be initiated by a PMCP client to connect to a PMCP server. A server that can also be a client shall be responsible for managing the connection separately from the other client connections. A client shall be allowed to open connections to as many PMCP servers as are available.

#### 4.3.3 Inactive Connections

It is expected that inactive and abnormal TCP connections will be detected and managed by TCP protocols. In addition, PMCP clients shall periodically monitor the status of connected servers and the transport connection by sending either heartbeat requests as defined in Section 5.11, or any other request as defined in Section 5.4.2. Also, PMCP servers shall monitor the status of connected clients and the transport connection by looking for heartbeat requests as defined in Section 5.11, or any other request as defined in Section 5.4.2.

Arrangements for managing connection failures and what to do in each case are left up to implementation by each manufacturer.

#### 4.3.4 Unicast

The PMCP protocol shall support only unicast over TCP/IP connections. If multicast functionality is required, it may be implemented by the client opening connections to all devices.

#### 4.3.5 List of Devices to Connect To

Each PMCP device that is configured as a client shall store a list of available PMCP devices (configured as servers) that it will need to communicate with. This list shall contain the IP address or DNS name of the device, the port number, the Device Name, and its Device Type (see Section 5.5). Arrangements for setting up and maintaining this list are left up to implementation by each manufacturer.

#### 4.3.6 List of Devices to Accept Connections From

It is recommended that each device that is configured as a server should keep a list of the IP addresses or DNS names for devices that it will accept connections from. This list may or may not be the same as the list of devices it can connect to. If the list is present, then devices that attempt to connect and are not in the list shall not be allowed a connection. Arrangements for setting up and maintaining this list are left up to implementation by each manufacturer.

#### 4.3.7 Initiation of Servers

When a device that is configured as a server is turned on, it shall begin accepting TCP/IP connections. When a client attempts to connect to the server, the server should reference its list of Devices to Accept Connections From (if present) before deciding to accept the connection.

#### 4.3.8 Sending of Messages

Once a connection is made from a client to a server, only the client may initiate communication. This communication can either be a “push” of information where the client sends data to the server, or a “pull” where the client requests certain information from the server. If there is a need for the server to initiate messages to the client, then a separate TCP/IP connection shall be opened where the client/server roles are reversed.

#### 4.3.9 Encryption

By agreement with the providers of all affected devices, system implementers may use methods of encryption, not specified herein, for secure communication within a system.

#### 4.3.10 Message format

All messages in PMCP shall be sent as XML documents as defined in Section 5.

## 5. XML SCHEMA DESCRIPTION

### 5.1 Introduction

The Extensible Markup Language (XML) [1] is a standard that allows structuring of information in a text document so that it is both human and machine-readable. It has a hierarchical structure, it can be easily extended and each piece of information can be labeled. A document compliant to the XML standard is said to be “well-formed”.

The XML Schema standard (XML Schema) [2] defines a way of describing a specific format for an XML document. A schema specifies which elements are allowed in a document, which elements can be the children of another element, which attributes an element can have and the data types that an element or an attribute can have. An XML document that complies with a given schema is said to be “valid”.

The PMCP schema defined in Annex A describes the structure of a Programming Metadata Communication Protocol (PMCP) message. It is mostly the transformation of the parameters and data needed to generate the tables defined in the ATSC transport (A/53C [3]) and PSIP (A/65B [4]) standards. Due to the nature of XML, it can be further extended to include other metadata that is not directly related to PSIP.

In the event of any discrepancy between the PMCP schema in Annex A and any other paragraph in this standard, the Annex A schema shall take precedence.

### 5.2 Namespace

The elements and attributes defined in a schema are referred to as a “markup vocabulary” and are specific to a given schema. It is envisaged that for the majority of users of this XML-based standard PMCP will be the default vocabulary of the XML document, or will unambiguously coexists with other vocabularies where explicit namespace use is unnecessary.

It is possible that there may be applications using PMCP where XML documents may contain markup vocabulary defined by multiple XML schemas. For those rare cases where the use of namespace cannot be avoided, the four lower-case letters “pmcp” shall be used as a namespace prefix to refer to the elements and attributes defined in this standard.

### 5.2.1 Examples:

#### 1) Private PMCP Information - PMCP is default and WM is explicit.

```
<PmcpMessage xmlns=http://www.atsc.org/pmcp/2004/3.0
xmlns:wm="http://www.atsc.org/XMLSchemas/pmcp/2006/0.9"...>
...
...
<PrivatePmcpInformation>
  <wm:Key date="yyyy-mm-dd">
    ...
    <wm:Channel .....>
      ...
    </wm:Channel>
  </wm:Key>
</PrivatePmcpInformation>
</PmcpMessage>
```

#### 2) SOAP Example where PMCP message is contained inside another XML SOAP document (namespace is not required).

```
<SOAP-ENV:Envelope
xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding">
  <SOAP-ENV:Body>
    <PmcpMessage xmlns="http://www.atsc.org/XMLSchemas/pmc/2006/3.0" id="17365" origin="psip_generator"
dateTime=
      "2009-12-16T09:30:48-05:00" type="reply">
      <PmcpReply id="12345" origin="automation_main" dateTime="2009-12-16T09:30:47-05:00"status="OK"/>
    </PmcpMessage>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

## 5.3 Naming Conventions

In order to guarantee consistency in the way elements, attributes and values are named the following conventions have been followed in the PMCP schema:

### Elements:

- a. All elements have their first letter of every word capitalized. Example **TransportStream**.
- b. Element names do not contain any space, underscore or hyphen sign.
- c. Acronyms in token names are treated like English words so only the first letter is capitalized. Example: **PsipEvent**.

### Attributes:

- a. All attributes start with a lower case letter.
- b. Any first letter of any word after the first one is capitalized.
- c. Attributes names do not contain any space or underscore.
- d. Acronyms in attribute names follow the same rules applied to English words, e.g. **pmtPid**.

**String Values of Attributes:**

- a. String values of attributes may use lower or upper case letters.
- b. Values do not contain spaces.
- c. Multiple word values are separated by an underscore.

**5.4 PMCP Messages**

Each PMCP message has a root element called “PmcpMessage”. It has a certain number of required attributes that identify the type of the message, its origin, and generation time. Unless otherwise described here, the semantics of all attributes shall be interpreted as described in [3] and [4].

**5.4.1 Message Validity**

Each PMCP message shall conform to the PMCP XML schema defined in Annex A. Senders may transmit messages conforming to other schemas, but messages shall not extend the schema of Annex A without formally declaring it as a new schema according to [1]. Receivers may reject malformed messages or messages conforming to a schema other than that defined in Annex A as further described below.

A PCMP message is valid if and only if it is valid with respect to the PMCP schema in Annex A and all constraints specified elsewhere in this standard.

**5.4.2 Message Type**

A PMCP message is either of type “information” (default), “request”, or “reply”. An information message may be sent to communicate some set of metadata information. A request message may be sent to communicate or request some information. Zero, one or two reply messages may be sent to acknowledge a specific information message. One or two reply messages shall be sent to acknowledge a specific request message. No reply message shall be sent otherwise. A reply message shall contain the “PmcpReply” element. No “PmcpReply” element shall be present in an information or request message.

A system heartbeat request message is sent using the root PmcpMessage alone. All other information, request, and reply messages comprise the root element and one or more child elements, and their attributes, as defined in the schema.

**5.5 Device Identification****5.5.1 Device Name**

Each device utilizing PMCP shall have a unique, alphanumeric Device Name. This name shall be unique within the facility (but not necessarily globally). The definition of the device name is left up to implementation by each manufacturer, and it is expected that this will be part of a device’s initial setup.

**5.5.2 Device Type**

The device type shall be included in all messages sent from the device, and may aid receiving devices in determining message priority and applicability. Device types shall be assigned and recorded in the ATSC Code Point Registry [5]. The device types are expected to be relatively



broad in scope, and it is possible that multiple devices within a facility will be of the same device type. **Table 5.1** identifies the currently defined device types.

**Table 5.1** PMCP Device Types

Automation
Conditional_Access
MPEG_Control
Program_Management
Table_Generator
Traffic
Listing_Service
Metadata_Extractor
Table_Extractor
Data_Server

## 5.6 Message Identification

Every message sent via PMCP shall have a Message ID number and Date/Time stamp so that the individual messages can be acknowledged. In addition, it shall include the Device Name and Device Type of the originating device so that the receiving device can identify the sender and take appropriate actions. This information shall be transmitted as part of the XML.

### 5.6.1 Message ID

The Message ID shall be a sequential number assigned by the originating device. Message ID numbering arrangements are left up to implementation by each manufacturer but shall be in accordance with the PMCP schema.

### 5.6.2 Time and Date Stamp

The timestamp shall indicate the time and date that the message was sent. The time and date shall be presented in standard XML schema dateTime format, including the offset from UTC (see Section 5.10).

## 5.7 Acknowledgement

The sending device shall have the option of asking for an acknowledgment for each message sent. The “PmcpReply” element is used for this and has a required “status” attribute that shall have one of the values “valid”, “invalid”, “OK” or “error”. It is envisioned that the request for acknowledgements will be used primarily in the connection based protocol, although it could be implemented with files if so desired.

### 5.7.1 Valid

Except as indicated below, a reply message with status “valid” shall be generated by the receiving device upon receipt of a properly formatted message containing a request for acknowledgement. This acknowledgement shall serve to let the sending device know that the

message has been received and that it appears to be valid with regard to this schema. It will not, however, indicate that action has been taken on the message. When the reply message responds with “valid”, then a second reply (with “OK” or “error” status) shall be sent later to indicate the final processing status. If the “OK” or “error” message is generated in time to satisfy the “first acknowledgement” timeout criteria in 5.7.5, then the prior “valid” reply is not required.

#### 5.7.2 Invalid

A reply message with status “invalid” shall be generated when the message has been received but does not comply with the schema described in this document and cannot be processed.

#### 5.7.3 OK

When the receiving device has finished acting on a message containing a request for acknowledgement, it shall send a reply message with status “OK”. This acknowledgement shall indicate that the action has been completed successfully.

#### 5.7.4 Error

If the action was not completed correctly, a reply message with status “error” shall be returned to the sending device along with a description of why the action could not be completed.

#### 5.7.5 Acknowledgement Timeout

The timeout period during which a first acknowledgment message should be received shall be configurable per connection, with a default value of 100 ms. If no response at all has been received by the sending device in this time period, it may consider the message lost and initiate a resend.

Since it is impossible to determine how long each and every action resulting from a request message will take, there is no timeout period for reply messages with status “OK” or “error” that are sent following a “valid” reply message. Therefore, it is up to the sending device to determine the proper amount of time to wait after sending the request message before deciding that the message was not acted upon.

#### 5.7.6 Multiple Requests

It is recommended that the sending device should not simply take a single lack of response to indicate a failed device or connection, but instead poll the device again to verify that there is no response.

The number of retries on the client side and the maximum time allowed between requests on both the client and the server sides shall be configurable per connection to address a wide variety of network configurations.

Further arrangements for managing lost messages, “error” and “invalid” messages and any resulting alarms and actions are left up to implementation by each manufacturer.

### 5.8 PmcpMessage Action Attributes

Many elements in a PmcpMessage may have an “action” attribute. The allowed values are “read”, “add”, “update” and “remove”. Only a request message may contain “action” attributes with the value “read”. A reply message shall not contain any “action” attribute.

- If an element has no “action” attribute, it is being sent for context and the receiver reads only the attributes necessary to uniquely identify the element. This element’s children may have an “action” attribute with any value.
- If an element has an “action” attribute with the value “read”, a reply message shall be sent in return, and it shall contain the current attributes and children for this element. The receiver of the request message should ignore all children elements and all attributes that are not necessary for unique identification.
- If an element has an “action” attribute with the value “add”, the whole element, including its children, may be added to the current environment of the receiver. If a child of such an element has an “action” attribute, its value shall be “add”. If there was already an element with the same ID, it and its children should be replaced.
- If there is an “action” attribute with the value “update”, all current attributes may be updated with the given values in the receiver environment. Each child element may have its own independent “action” attribute.
- If an element has an “action” attribute with the value “remove”, the referenced element may be deleted from the receiver environment of the receiving device. Only the attributes required for unique identification should be interpreted by the receiver. All children elements and all other attributes should be ignored.

## 5.9 PmcpMessage Children

**Figure 5.1** shows the highest-level children of a PMCP message.

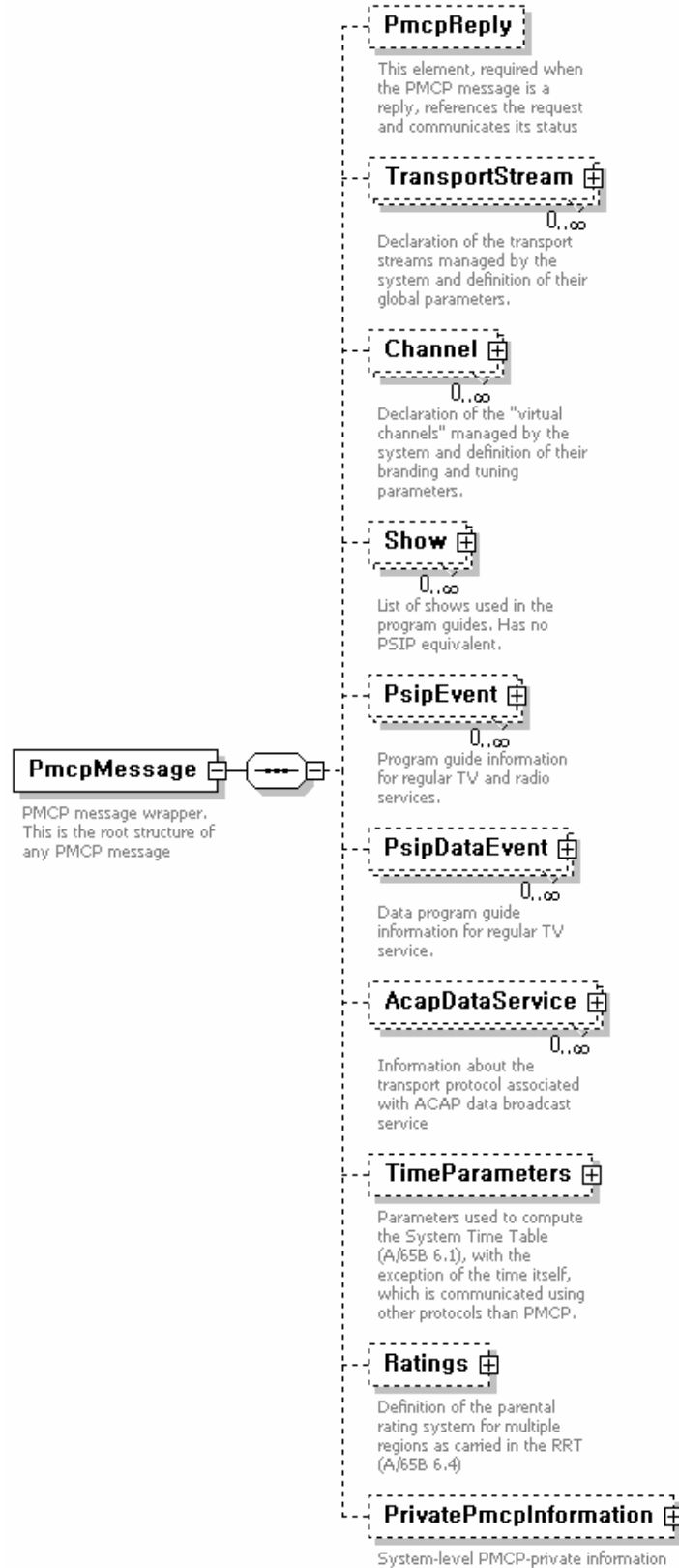


Figure 5.1 PMCP message diagram.

In this diagram, the dotted lines surrounding a child element mean that this element is optional and may not be present. The “0..∞” symbol means that the element may be present an infinite number of times.

Other child elements are defined in the schema as children of the elements shown above. These carry specific metadata related to the parent element, they also may have children, and so on in a hierarchical fashion.

Unless stated in the next sections, an element is uniquely referenced by its required attribute. No two elements sharing the same reference shall be present in a PMCP message.

### 5.9.1 PmcpReply

The “Reply” element is a special case message used in various ways as described in Section 5.7.

### 5.9.2 Transport Stream

A “TransportStream” element carries the information about a transport stream that is managed by the system. It carries only the information that applies to the whole transport stream and not to a specific channel.

A Transport Stream is uniquely referenced by its `tsid` and network attributes. In a system where TSIDs are unique, such as US terrestrial DTV, the network attribute may be omitted, otherwise it is required.

### 5.9.3 Channel

A “Channel” element carries the information about an ATSC “virtual channel” (see A/65B [4], Section 6.3 on the VCT). All the information found at this level is currently valid for the channel and supersedes whatever information is associated with the current PSIP event (see A/65B [4], Section 6.5 on the EIT, and Section 5.9.5.1 below).

The `tsid` and network attributes of the transport stream that carries the channel shall be present if necessary to uniquely define the referenced channel. A channel is referenced by either its `channelNumber` or `sourceId` attribute, and one of these attributes shall always be present. `ChannelNumber` shall be the default method of identification, but devices intended for use in a station environment shall support both methods of identification. By agreement with the providers of all affected devices, system implementers may choose to implement `sourceID` for channel identification between devices in a closed system environment such as an individual station.

### 5.9.4 Show

The “Show” element may be used to communicate metadata about a show independently of when it is scheduled. Both the “ContentId” and “ShowData” elements are required. The “ContentId” element shall contain the show label for one or more numbering schemes and should uniquely reference a show.

Where PMCP system implementers choose to use the `HouseNumber` or `AlternateId` identifiers for `ContentId`, they should ensure that the scheme used provides unique identification for the show for as long as the show is persistent in any part of the system that may receive PMCP messages relying on those identifiers. In the event that duplication of the `ContentId` occurs, it must be accepted that any updated show data will be applied to more than one show with the same identifier.

#### 5.9.4.1 ISAN

The ISAN numbering scheme used for the ContentIDType/Isan element is defined in ISO 15706-2 [6]. The attributes for the IsanType shall comply with the constraints defined in [6].

#### 5.9.5 PsipEvent

The “PsipEvent” element is the main structure used to communicate both current and future electronic program guide (EPG) information. It shall always have an “EventId” element, used to label or reference the event. The channel used to carry the PSIP Event is referenced through a mandatory “channelNumber” attribute. Optional “tsid” and “network” attributes may be used to further specify the channel when the channel number is not unique in the system. The “Current” element may be used to reference the current event of the channel when no other reference is known. The “Default” element references a default PSIP event, used by the PSIP Generator to fill in the empty time slots of the channel. All other PSIP events shall be referenced using at least one of the following elements:

- PmcpEventId is the preferred referencing method and consists of the event creator device name combined with a unique sequential number assigned by this creator.
- InitialSchedule may be used either to assign the start time initially scheduled by the creator or to reference an event by its initial start time when the PmcpEventId is not known. The initially scheduled start time shall not be modified during the existence of a PSIP event. Adjustments to the actual start time shall be done through the “startTime” attribute of the “PsipEvent” element.
- PsipEventId may be used to reference an event by its PSIP event\_id, as carried in the EIT. This value is assigned by the PSIP Generator. It is therefore not known before the event has been scheduled in the PSIP Generator.

##### 5.9.5.1 Precedence for PSIP Event Metadata

The order of precedence for the receiving device with respect to default, current, and regular PSIP events shall be:

- The current parameters associated with the channel, where available, supersede channel information that was otherwise set with PSIP event metadata for the current event.
- Regular and current PSIP events are normally used to communicate schedule information.
- The default PSIP event is used whenever no other information is available about a particular schedule time slot.

The information about an event may be communicated in two non-exclusive ways:

- The PSIP event may be linked to a show defined either previously or in the same PMCP message through a “ContentId” element.
- The PSIP event may contain its own “ShowData” element.

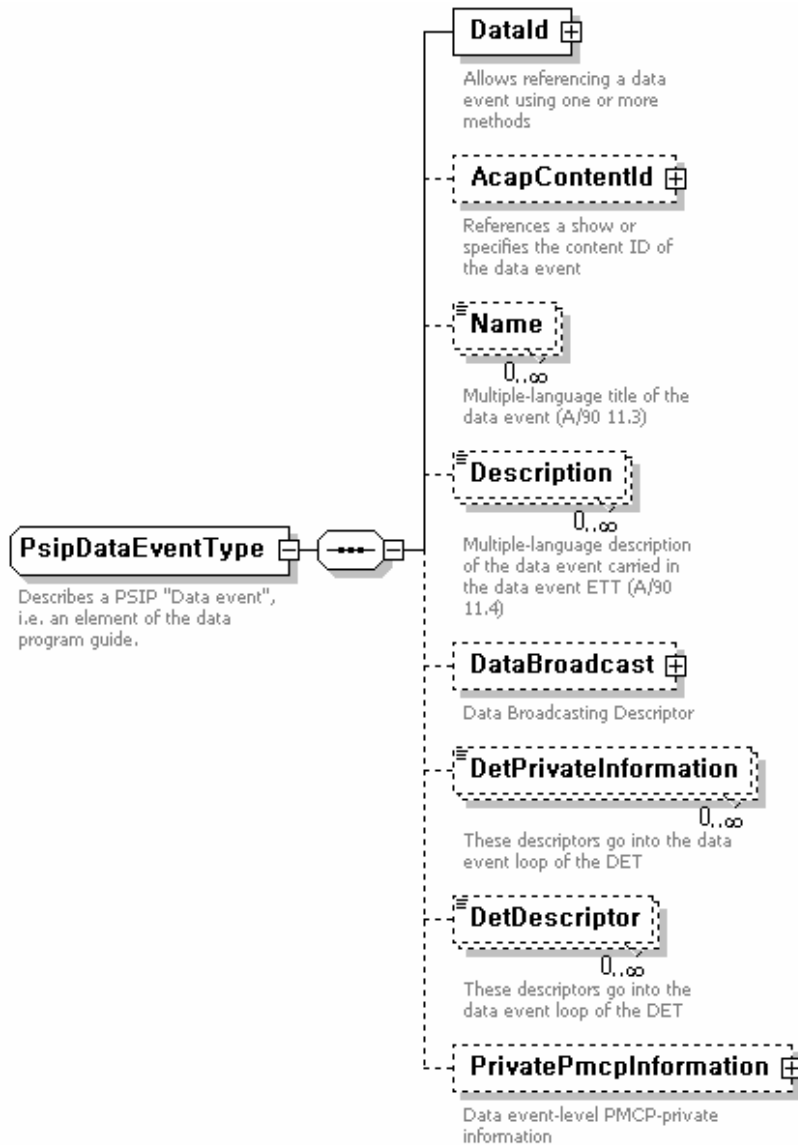
When the same type of information is provided through both mechanisms in the same message, the information coming from the “ShowData” element shall take precedence.

Multiple events may be linked to the same show. This provides an efficient way of using the same metadata for multiple events.

### 5.9.6 PSIP Data Events

`PsipDataEventType` is similar to `PsipEventType` in terms of schema structure. The `PsipDataEvent` element enables the PMCP schema to be extended for ACAP announcement. There are four differences between `PsipDataEventType` and `PsipEventType`.

- First, `PsipDataEventType` substitutes a “DataId” element instead of an “EventId”, used to label or reference the event related to data.
- Second, `PsipDataEventType` contains a new `AcapContentId` element that is substituted for `ContentId` because data contents are created and managed separately from AV content.
- Third, `PsipDataEventType` substitutes a “DetPrivateInformation” element and a “DetDescriptor” element instead of an “EitPrivateInformation” element and an “EitDescriptor” element, needed for generating PSIP DET[A/90].
- Fourth, it adds the `DataBroadcast` element that is used to identify data broadcast services in the ATSC framework. This element is used to from the data broadcast descriptor which identifies the type of the data component and may be used to provide a text description of the data component.
- Fifth, `PsipDataEventType` includes only the “Name” element and “Description” element among the children of “ShowData” element because Data Event Table don’t have to carry the information related to the parental rating, audio service, caption service and redistribution control as Event Information Table. The “Name” element describes the data event title in the format of the Multiple String Structure and the “Description” element represents the detailed description of a data event.



**Figure 5.2** PSIP Data Event type diagram

The PspDataEvent shall be optional and when present shall be placed as shown in the XML schema (If there is any conflict between this requirement and the XML schema attached, the schema shall take precedence.).

### 5.9.7 AcapService

ATSC has standardized a software layer to enable support for common applications to provide advanced interactive services. The middleware is defined in ATSC Standard A/101 (2005), "Advanced Common Application Platform". This standard (A/101) also defines how to arrange and transmit the data elements that make up a ACAP data service. The schema AcapService provides for the signaling of the data structures to support an ACAP service.



### 5.9.8 PrivatePmcpInformation

The PrivatePmcpInformation element is the mechanism used to carry private elements and attributes in a PCMP message. The following constraints apply:

- Elements not defined in the PMCP schema (Private PCMP Elements) are prohibited except when enclosed by the PrivatePmcpInformation element.
- Attributes not defined in the PMCP schema are prohibited except when in Private PCMP Elements.
- All private elements and attributes shall use an XML namespace prefix.

### 5.9.9 Other Children

The PmcpMessage children: TimeParameters and Ratings carry the values for the various parameters in the PSIP System Time Table (STT) and Regional Rating Table (RRT) and map to those tables.

## 5.10 PMCP Time Messages

All PMCP time fields defined in the PMCP Schema follow the standard XML date/time format and, using the timezone offset syntax, can refer to any time zone (see <http://www.w3.org/TR/xmlschema-2/#datetime>). Based on the techniques described in Annex C, PMCP time will be ultimately referenced to UTC. The PSIP Event has additional optional start frame time and duration frame attributes to allow times for Events to be specified with frame accuracy where this is required.

## 5.11 Heartbeat

In a connection-based implementation, each PMCP client shall poll each PMCP server that it is connected to with a heartbeat request and shall look for a heartbeat reply message back.

Each PMCP server shall monitor each connected PMCP client by looking for periodic heartbeat request messages.

### 5.11.1 Heartbeat Messages

The heartbeat request shall be sent using the root PmcpMessage alone as indicated in Section 5.4.2. This message shall include the sending device's type and identification, and shall have a "type" attribute with the value "request".

The heartbeat reply is the acknowledgement of the heartbeat request, as defined in Section 5.7, normally with status attribute "OK".

Examples of such messages are given in Annex B.

### 5.11.2 Heartbeat Timing

On the client side, the interval between heartbeat request messages shall be configurable per connection. Its minimum value shall be less than or equal to one second. Its maximum value shall be greater than or equal to one minute. In the event that any other message with an acknowledgement request is sent by the client within the same period, this may take the place of the heartbeat request.

The timeout period that the client shall use for the acknowledgement response is defined in Section 5.7.5. The client shall ensure that the heartbeat request interval is always greater than this timeout.

### 5.11.3 Server Heartbeat Timeout

The server heartbeat timeout is defined as the maximum duration that the server waits between two heartbeat request messages before deciding that a message has been lost. It shall be configurable per connection. Its minimum value shall be less than or equal to one second. Its maximum value shall be greater than or equal to one minute.

It is recommended that the server should not simply take a single lost heartbeat request to indicate a failed device or connection, but instead wait for subsequent messages to verify if they are also lost. The number of heartbeat periods to wait before considering the connection lost shall be configurable per connection. In order to prevent false communication failure alarms, while detecting communication failures in a timely fashion, the server time out period and number of periods to wait should be adjusted during system set up based on the heartbeat message period set for the client.

### 5.11.4 Failed Device

If a device does not respond to repeated polling messages, the sending device should assume that the device is no longer in service and should address the backup device if one exists.

Further arrangements for managing heartbeat messages and any resulting alarms and actions are left up to implementation by each manufacturer.

## 5.12 Message Priority and Conflict Management

In many cases, it is foreseeable that a given device could receive multiple, potentially conflicting, pieces of information from different sources. How these conflicts are handled is left up to implementation by each manufacturer. Possible methods include “Last Message” mode where the last message sent (based on the message send time) is used, or a more intelligent approach where the receiving device takes into account the sender’s name and device type and the amount of time before air. It is expected that certain devices will have more relevant or more reliable information depending on how close to broadcast time it is for the related PSIP event. In these cases, having a message send time, and device name and type to identify the sending device will aid the receiving device in making a decision on how best to handle the messages.

It is recommended that the PSIP table generator and other systems’ validity rules should be configurable based on input from a user interface or configuration control system, as may be necessary for network and station operational changes.

## Annex A: PMCP Schema

### Schema **PMCP2.2.xsd**

schema location: [..\PMCP2.2.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: **http://www.atsc.org/XMLSchemas/pmcp/2006/2.2**

Elements	Complex types	Simple types
<a href="#">PmcpMessage</a>	<a href="#">PmcpReplyType</a>	<a href="#">messageType</a>

schema location: [..\TransportStream.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: **http://www.atsc.org/XMLSchemas/pmcp/2006/2.2**

Complex types	Simple types
<a href="#">TableType</a>	<a href="#">modulationType</a>
<a href="#">TransportStreamType</a>	<a href="#">networkTypeType</a>
	<a href="#">pathSelectType</a>

schema location: [..\Channel.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: **http://www.atsc.org/XMLSchemas/pmcp/2006/2.2**

Complex types	Simple types
<a href="#">ChannelCopyType</a>	<a href="#">channelStatusType</a>
<a href="#">ChannelType</a>	<a href="#">serviceType</a>
<a href="#">DeferredAssociationTagsType</a>	<a href="#">shortNameType</a>
<a href="#">TimeShiftedServiceType</a>	

schema location: [..\Event.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: **http://www.atsc.org/XMLSchemas/pmcp/2006/2.2**

Complex types	Simple types
<a href="#">DataIdType</a>	<a href="#">psipEventIdType</a>
<a href="#">EventIdType</a>	
<a href="#">InitialScheduleType</a>	
<a href="#">PmcpEventIdType</a>	
<a href="#">PsipDataEventType</a>	
<a href="#">PsipDataIdType</a>	

[PspEventIdType](#)[PspEventType](#)

schema location: [../TimeParameters.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: <http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types  
[TimeParametersType](#)

Simple types  
[dsDayOfMonthType](#)  
[dsHourType](#)

schema location: [../AcapService.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: <http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types  
[AcapApplicationType](#)  
[AcapDataServiceType](#)  
[AcapJAppLocationType](#)  
[AcapJAppType](#)  
[AcapObjectCarouselType](#)  
[AcapXAppBoundaryType](#)  
[AcapXAppLocationType](#)  
[AcapXAppType](#)  
[ApplicationInfoType](#)  
[ApplicationType](#)  
[BindingsType](#)  
[BiopProfileBodyType](#)  
[CachingPriorityType](#)  
[CompressedModuleType](#)  
[ContentTypeType](#)  
[DataCarouselType](#)  
[DiiListType](#)  
[DiiLocationType](#)  
[DiiType](#)  
[DirectoryType](#)  
[DsiType](#)  
[EventListType](#)  
[FileType](#)  
[HttpProfileBodyType](#)  
[IconType](#)  
[LabelsType](#)  
[LabelType](#)  
[LiteOptionsProfileBodyType](#)  
[ModuleType](#)  
[ObjectCarouselType](#)  
[ObjectListType](#)

Simple types  
[controlCodeType](#)  
[eventNPTType](#)  
[iconFlagsType](#)  
[identificationType](#)  
[priorityType](#)  
[transparencyLabelType](#)  
[useType](#)  
[visibilityType](#)

[PidListType](#)  
[PrefetchType](#)  
[ProfilesType](#)  
[ProtocolLabelsType](#)  
[ServiceGatewayType](#)  
[StreamEventType](#)  
[StreamType](#)  
[TapType](#)  
[TransportProtocolType](#)

schema location: [..\pmcptype.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: <http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types

[ConditionalAccessType](#)  
[DescriptorType](#)  
[PrivateInformationType](#)  
[PrivatePmcplInformationType](#)  
[RedistributionControlType](#)  
[TextType](#)

Simple types

[actionType](#)  
[applicationTypeType](#)  
[audioldType](#)  
[channelNumberType](#)  
[elementaryErrorType](#)  
[errorType](#)  
[languageType](#)  
[onePartType](#)  
[pidType](#)  
[privateInformationDataType](#)  
[statusType](#)  
[twoPartType](#)

schema location: [..\ElementaryStream.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: <http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types

[ApplicationSignalingType](#)  
[ApplicationTypesType](#)  
[AssociationTagsType](#)  
[AssociationTagType](#)  
[CarouselIdentifierType](#)  
[DataBroadcastIdType](#)  
[ElementaryStreamType](#)  
[StreamIdentifierType](#)

Simple types

[formatIdType](#)

schema location: [..\Audios.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: <http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types

[Ac3AudioType](#)  
[AudiosType](#)

Simple types

[audioServiceType](#)  
[bitRateKbpsType](#)  
[bsidType](#)  
[mainidType](#)  
[numChannelsType](#)

schema location:

[..\RegionRating.xsd](#)

attribute form default:

element form default:

**qualified**

targetNamespace:

<http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types

[DimensionType](#)  
[ParentalRatingType](#)  
[RatingsType](#)  
[RatingType](#)  
[RatingValueType](#)  
[RegionType](#)

schema location:

[..\Captions.xsd](#)

attribute form default:

element form default:

**qualified**

targetNamespace:

<http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types

[Caption608Type](#)  
[Caption708Type](#)  
[CaptionsType](#)

Simple types

[ccServiceType](#)

schema location:

[..\EssenceMetaData.xsd](#)

attribute form default:

element form default:

**qualified**

targetNamespace:

<http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types

[ShowDataType](#)  
[ShowType](#)

schema location:

[..\ContentId.xsd](#)

attribute form default:

element form default:

**qualified**

targetNamespace:

<http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types

- [AlternateIdType](#)
- [ContentIdType](#)
- [HouseNumberType](#)

schema location: [...DataBroadcast.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: <http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types  
[DataBroadcastType](#)

Simple types  
[carouselTypeeldType](#)  
[leakRateType](#)

schema location: [...VISAN.xsd](#)  
 attribute form default:  
 element form default: **qualified**  
 targetNamespace: <http://www.atsc.org/XMLSchemas/pmcp/2006/2.2>

Complex types  
[IsanType](#)

Simple types  
[isanCheckType](#)  
[isanEpisodeType](#)  
[isanRootType](#)  
[isanVersionType](#)

element **PmcpMessage**

properties	content complex					
children	<a href="#">PmcpReply</a> <a href="#">TransportStream</a> <a href="#">Channel</a> <a href="#">Show</a> <a href="#">PsipEvent</a> <a href="#">PsipDataEvent</a> <a href="#">AcapDataService</a> <a href="#">TimeParameters</a> <a href="#">Ratings</a> <a href="#">PrivatePmcpInformation</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	id	<b>xsd:unsignedInt</b>	required			documentation unique number assigned to the message by its originating system
	origin	<b>xsd:string</b>	required			documentation Device name of the originating system of the message
	originType	<b>xsd:string</b>	required			documentation Type of the originating system (see ATSC code point registry)
	destination	<b>xsd:string</b>	optional	all		documentation Device name of the intended destination for

	dateTime	<b>xsd:dateTime</b>	required		the message documentation Date and time of generation of the message
	type	<a href="#">messageType</a>	optional	information	documentation Message type
	error	<a href="#">errorType</a>	optional		
annotation	documentation PMCP message wrapper. This is the root structure of any PMCP message				

**element PmcpMessage/PmcpReply**

type	<a href="#">PmcpReplyType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	id	<b>xsd:unsignedInt</b>	required			documentation id of the request message
	origin	<b>xsd:string</b>	required			documentation Originating system of the request message
	originType	<b>xsd:string</b>	optional			documentation Type of the originating system for the request message
	destination	<b>xsd:string</b>	optional	all		documentation Intended destination for the request message
	dateTime	<b>xsd:dateTime</b>	required			documentation Date and time of generation of the request message
	status	<a href="#">statusType</a>	required			documentation Indicates the result of processing the request
annotation	documentation This element, required when the PMCP message is a reply, references the request and communicates its status					

**element PmcpMessage/TransportStream**

type	<a href="#">TransportStreamType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Name</a> <a href="#">ConditionalAccess</a> <a href="#">Table</a> <a href="#">MgtPrivateInformation</a> <a href="#">VctPrivateInformation</a> <a href="#">MgtDescriptor</a> <a href="#">VctDescriptor</a> <a href="#">PrivatePmcpInformation</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	tsid	<b>xsd:unsignedShort</b>	required			documentation TSID of the



	network	<b>xsd:unsignedShort</b>	optional	transport stream (A/65B 6.3) documentation Network identifier, used when the TSID is not unique in the system documentation RF frequency occupied by the transport stream (A/65B 6.3) documentation Type of the network where the transport stream is carried documentation Modulation used to carry the transport stream (A/65B 6.3) documentation For cable systems with two separate cables, indicates which one carries the transport stream (A/65B 6.3.2)
	frequency	<b>xsd:unsignedInt</b>	optional	
	networkType	<a href="#">networkTypeType</a>	optional	
	modulation	<a href="#">modulationType</a>	optional	
	pathSelect	<a href="#">pathSelectType</a>	optional	
	action error	<a href="#">actionTypeError</a>	optional	
annotation	documentation Declaration of the transport streams managed by the system and definition of their global parameters.			

element **PmcpMessage/Channel**

type	<a href="#">ChannelType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Name</a> <a href="#">Description</a> <a href="#">ElementaryStream</a> <a href="#">ParentalRating</a> <a href="#">Audios</a> <a href="#">Captions</a> <a href="#">RedistributionControl</a> <a href="#">TimeShiftedService</a> <a href="#">ConditionalAccess</a> <a href="#">DeferredAssociationTags</a> <a href="#">PmtPrivateInformation</a> <a href="#">VctPrivateInformation</a> <a href="#">PmtDescriptor</a> <a href="#">VctDescriptor</a> <a href="#">PrivatePmcpInformation</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	channelNumber	<a href="#">channelNumberType</a>	optional			documentation Two-part or one-part channel number of the virtual channel
	tsid	<b>xsd:unsignedShort</b>	optional			documentation TSID of the carrying transport stream (A/65B 6.3)
	network	<b>xsd:unsignedShort</b>	optional			documentation

	<b>hort</b>			Network identifier, used when the TSID is not unique in the system documentation MPEG-2 program number used by the virtual channel (A/65B 6.3)
programNumber	<b>xsd:unsignedShort</b>	optional		documentation PSIP source_id (A/65B 6.3)
sourceId	<b>xsd:unsignedShort</b>	optional		documentation Current activity status of the channel (A/65B 6.3)
status	<a href="#">channelStatusType</a>	optional		documentation hidden and hide_guide) (A/65B 6.3)
type	<a href="#">serviceType</a>	optional		documentation Type of the primary service provided by the channel: TV, radio or data (A/65B 6.3)
ca	<b>xsd:boolean</b>	optional		documentation service_type) Specifies if this channel is partly or completely encrypted and access-controlled (A/65B 6.3)
shortName	<a href="#">shortNameType</a>	optional		documentation access_controlled) PSIP short name (7 characters max.) (A/65B 6.3)
outOfBand	<b>xsd:boolean</b>	optional		documentation When true, signals that the PSIP data is not carried in the same physical channel as the virtual channel itself (A/65B 6.3.2)
pmtPid	<a href="#">pidType</a>	optional		documentation PID used to carry the MPEG-2 PMT of the channel (A/53B 5.4)
pcrPid	<a href="#">pidType</a>	optional		documentation PID used to carry the PCR

	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	fields of the channel, same as video PID per ATSC rules (A/53B 5.4)
annotation	documentation Declaration of the "virtual channels" managed by the system and definition of their branding and tuning parameters.	

element **PmcpMessage/Show**

type	<a href="#">ShowType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">ContentId</a> <a href="#">ShowData</a> <a href="#">PrivatePmcpInformation</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation List of shows used in the program guides. Has no PSIP equivalent.					

element **PmcpMessage/PsipEvent**

type	<a href="#">PsipEventType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">EventId</a> <a href="#">ContentId</a> <a href="#">AcapContentId</a> <a href="#">ShowData</a> <a href="#">EitPrivateInformation</a> <a href="#">EitDescriptor</a> <a href="#">PrivatePmcpInformation</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	startTime	<b>xsd:dateTime</b>	optional			documentation Actual start time of the event (A/65B 6.5), when different from the scheduled start time
	startFrame	<b>xsd:unsignedByte</b>	optional			documentation Frame count for the actual start time of the event, when a one-second accuracy is not sufficient.
	duration	<b>xsd:duration</b>	optional			documentation Duration of the event (A/65B 6.5)
	durationFrame	<b>xsd:unsignedByte</b>	optional			documentation Additional frames for the actual duration of the event, when a one-second accuracy is not sufficient.

	alternateScheduleNumber	<b>xsd:positiveInteger</b>	optional	documentation Indicates that the event is part of an alternate schedule and is not carried in PSIP.
	fromStart	<b>xsd:duration</b>	optional	documentation Indicates the offset between the beginning of the material and the beginning of the event, e.g. the tape or the file. Not carried in PSIP.
	fromStartFrame	<b>xsd:unsignedByte</b>	optional	documentation Additional frames for the material offset, when a one-second accuracy is not sufficient.
	essenceSource	<b>xsd:string</b>	optional	documentation Not carried in PSIP. Indicates where the essence comes from or how it is generated. Communicates implicit authority. The allowed values are defined during the setup process.
	action	<a href="#">actionType</a>	optional	
	error	<a href="#">errorType</a>	optional	
annotation	documentation Program guide information for regular TV and radio services.			

element **PmcpMessage/PsipDataEvent**

type	<a href="#">PsipDataEventType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">DataId</a>	<a href="#">AcapContentId</a>	<a href="#">Name</a>	<a href="#">Description</a>	<a href="#">DataBroadcast</a>	<a href="#">DetPrivateInformation</a>
	<a href="#">PrivatePmcpInformation</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	startTime	<b>xsd:dateTime</b>	optional			documentation Actual start time of the data event (A/90 11.3), when different from the scheduled start time

	duration	<b>xsd:duration</b>	optional	<p>documentation Duration of the data event (A/90 11.3)</p> <p>documentation Indicates that the data event is part of an alternate schedule and is not carried in PSIP</p> <p>documentation Indicates the offset between the beginning of the material and the beginning of the data event. Not carried in PSIP.</p> <p>documentation Not carried in PSIP. Indicates where the essence comes from or how it is generated. Communicates implicit authority. The allowed values are defined during the setup process.</p>
	alternateScheduleNumber	<b>xsd:positiveInteger</b>	optional	
	fromStart	<b>xsd:duration</b>	optional	
	essenceSource	<b>xsd:string</b>	optional	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional	
annotation	documentation Data program guide information for regular TV service.			

**element PmcpMessage/AcapDataService**

type	<a href="#">AcapDataServiceType</a>							
properties	isRef	0	minOcc	0	maxOcc	unbounded	content	complex
children	<a href="#">AcapContentId</a> <a href="#">AcapApplication</a> <a href="#">AcapObjectCarousel</a> <a href="#">PrivatePmcpInformation</a>							
attributes	Name	Type	Use	Default	Fixed	Annotation		
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional					
annotation	documentation Information about the transport protocol associated with ACAP data broadcast service							

**element PmcpMessage/TimeParameters**

type	<a href="#">TimeParametersType</a>							
properties	isRef	0	minOcc	0	maxOcc	1	content	complex

children	<a href="#">SttPrivateInformation</a> <a href="#">SttDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	gpsUtcOffset	<b>xsd:unsignedByte</b>	optional			documentation Current GPS UTC offset, as published by the International Earth Rotation Service (A/65B 6.1)
	dsStatus	<b>xsd:boolean</b>	optional			documentation Current daylight savings status (A/65B 6.1 and Annex A)
	dsDayOfMonth	<a href="#">dsDayOfMonthType</a>	optional			documentation If DST is to change within a month, day of change (A/65B 6.1 and Annex A)
	dsHour	<a href="#">dsHourType</a>	optional			documentation If DST is to change within a month, hour of change (A/65B 6.1 and Annex A)
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Parameters used to compute the System Time Table (A/65B 6.1), with the exception of the time itself, which is communicated using other protocols than PMCP.					

### element PmcpMessage/Ratings

type	<a href="#">RatingsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Region</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Definition of the parental rating system for multiple regions as carried in the RRT (A/65B 6.4)					

### element PmcpMessage/PrivatePmcpInformation

type	<a href="#">PrivatePmcpInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
annotation	documentation System-level PMCP-private information					

complexType **PmcpReplyType**

used by	element <a href="#">PmcpMessage/PmcpReply</a>					
attributes	Name id	Type <b>xsd:unsignedInt</b>	Use required	Default	Fixed	Annotation documentation id of the request message
	origin	<b>xsd:string</b>	required			documentation Originating system of the request message
	originType	<b>xsd:string</b>	optional			documentation Type of the originating system for the request message
	destination	<b>xsd:string</b>	optional	all		documentation Intended destination for the request message
	dateTime	<b>xsd:dateTime</b>	required			documentation Date and time of generation of the request message
	status	<a href="#">statusType</a>	required			documentation Indicates the result of processing the request
annotation	documentation This element, required when the PMCP message is a reply, references the request and communicates its status					

simpleType **messageType**

type	restriction of <b>xsd:string</b>					
used by	attribute <a href="#">PmcpMessage/@type</a>					
facets	enumeration enumeration enumeration	information request reply				
annotation	documentation Possible message types					

complexType **TableType**

children	<a href="#">MgtPrivateInformation MgtDescriptor</a>					
used by	element <a href="#">TransportStreamType/Table</a>					
attributes	Name tableType	Type <b>xsd:unsignedShort</b>	Use required	Default	Fixed	Annotation documentation MGT table type (A/65B 6.2)
	tablePid	<a href="#">pidType</a>	optional			documentation PID used to carry the table (A/65B 6.2)
	periodMs	<b>xsd:positiveInteger</b>	optional			documentation Repetition

	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	period of the table, in milliseconds
annotation	documentation Contains the information about a PSIP table, used to build the MGT (A/65B 6.2)	

### element **TableType/MgtPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the inner loop of the MGT					

### element **TableType/MgtDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the inner loop of the MGT					

### complexType **TransportStreamType**

children	<a href="#">Name</a> <a href="#">ConditionalAccess</a> <a href="#">Table</a> <a href="#">MgtPrivateInformation</a> <a href="#">VctPrivateInformation</a> <a href="#">MgtDescriptor</a> <a href="#">VctDescriptor</a> <a href="#">PrivatePmcplInformation</a>					
used by	element	<a href="#">PmcpMessage/TransportStream</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	tsid	<b>xsd:unsignedShort</b>	required			documentation TSID of the transport stream (A/65B 6.3)
	network	<b>xsd:unsignedShort</b>	optional			documentation Network identifier, used when the TSID is not unique in the system
	frequency	<b>xsd:unsignedInt</b>	optional			documentation RF frequency occupied by



	<p>networkType      <a href="#">networkTypeType</a>      optional</p> <p>modulation      <a href="#">modulationType</a>      optional</p> <p>pathSelect      <a href="#">pathSelectType</a>      optional</p> <p>action error      <a href="#">actionType</a>      optional</p> <p>                     <a href="#">errorType</a>      optional</p>	<p>the transport stream (A/65B 6.3)</p> <p>documentation</p> <p>Type of the network where the transport stream is carried</p> <p>documentation</p> <p>Modulation used to carry the transport stream (A/65B 6.3)</p> <p>documentation</p> <p>For cable systems with two separate cables, indicates which one carries the transport stream (A/65B 6.3.2)</p>
annotation	<p>documentation</p> <p>Used to define the parameters of a transport stream</p>	

**element TransportStreamType/Name**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	<p>documentation</p> <p>Name of the transport stream. Not used in PSIP.</p>					

**element TransportStreamType/ConditionalAccess**

type	<a href="#">ConditionalAccessType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	systemId	<b>xsd:unsignedShort</b>	required			documentation
						Conditional access system ID
	pid	<a href="#">pidType</a>	optional			documentation
						EMM or ECM PID, depending on context
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	<p>documentation</p> <p>Defines the CA systems in use and the corresponding EMM PIDs</p>					

element **TransportStreamType/Table**

type	<a href="#">TableType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">MgtPrivateInformation</a> <a href="#">MgtDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	tableType	<b>xsd:unsignedShort</b>	required			documentation MGT table type (A/65B 6.2)
	tablePid	<a href="#">pidType</a>	optional			documentation PID used to carry the table (A/65B 6.2)
	periodMs	<b>xsd:positiveInteger</b>	optional			documentation Repetition period of the table, in milliseconds
action error		<a href="#">actionType</a>	optional			
		<a href="#">errorType</a>	optional			
annotation	documentation Defines the broadcast parameters of a PSIP table.					

element **TransportStreamType/MgtPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
	action error	<a href="#">actionType</a>	optional			
		<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the outer loop of the MGT (A/65B 6.2)					

element **TransportStreamType/VctPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
action		<a href="#">actionType</a>	optional			

	error	<a href="#">errorType</a>	optional
annotation	documentation These descriptors go into the outer loop of the VCT (A/65B 6.3)		

### element **TransportStreamType/MgtDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedB yte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the outer loop of the MGT (A/65B 6.2)					

### element **TransportStreamType/VctDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedB yte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the outer loop of the VCT (A/65B 6.3)					

### element **TransportStreamType/PrivatePmcpInformation**

type	<a href="#">PrivatePmcpInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
annotation	documentation Transport Stream-level PMCP-private information					

### simpleType **modulationType**

type	restriction of <b>xsd:string</b>					
used by	attribute	<a href="#">TransportStreamType/@modulation</a>				
facets	enumeration	analog				
	enumeration	SCTE_mode_1				
	enumeration	SCTE_mode_2				
	enumeration	8_VSB				
	enumeration	16_VSB				
	enumeration	private				
annotation	documentation Possible modulations					

### simpleType **networkType**

type	restriction of <b>xsd:string</b>					
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used by	attribute <a href="#">TransportStreamType/@networkType</a>
facets	enumeration terrestrial enumeration cable enumeration satellite
annotation	documentation Possible network types

simpleType **pathSelectType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">TransportStreamType/@pathSelect</a>
facets	enumeration path_1 enumeration path_2
annotation	documentation Possible paths for cable systems with multiple cables

complexType **ChannelCopyType**

used by	element <a href="#">TimeShiftedServiceType/Copy</a>																		
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>timeShift</td> <td><b>xsd:duration</b></td> <td>required</td> <td></td> <td></td> <td>documentation Delay compared to the reference channel</td> </tr> <tr> <td>channel</td> <td><a href="#">channelNumberType</a></td> <td>required</td> <td></td> <td></td> <td>documentation Channel number of the time-shifted copy</td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	timeShift	<b>xsd:duration</b>	required			documentation Delay compared to the reference channel	channel	<a href="#">channelNumberType</a>	required			documentation Channel number of the time-shifted copy
Name	Type	Use	Default	Fixed	Annotation														
timeShift	<b>xsd:duration</b>	required			documentation Delay compared to the reference channel														
channel	<a href="#">channelNumberType</a>	required			documentation Channel number of the time-shifted copy														
annotation	documentation Type for a time shifted service																		

complexType **ChannelType**

children	<a href="#">Name</a> <a href="#">Description</a> <a href="#">ElementaryStream</a> <a href="#">ParentalRating</a> <a href="#">Audios</a> <a href="#">Captions</a> <a href="#">RedistributionControl</a> <a href="#">TimeShiftedService</a> <a href="#">ConditionalAccess</a> <a href="#">DeferredAssociationTags</a> <a href="#">PmtPrivateInformation</a> <a href="#">VctPrivateInformation</a> <a href="#">PmtDescriptor</a> <a href="#">VctDescriptor</a> <a href="#">PrivatePmcplInformation</a>																														
used by	element <a href="#">PmcpMessage/Channel</a>																														
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>channelNumber</td> <td><a href="#">channelNumberType</a></td> <td>optional</td> <td></td> <td></td> <td>documentation Two-part or one-part channel number of the virtual channel</td> </tr> <tr> <td>tsid</td> <td><b>xsd:unsignedShort</b></td> <td>optional</td> <td></td> <td></td> <td>documentation TSID of the carrying transport stream (A/65B 6.3)</td> </tr> <tr> <td>network</td> <td><b>xsd:unsignedShort</b></td> <td>optional</td> <td></td> <td></td> <td>documentation Network identifier, used when the TSID is not unique in the system</td> </tr> <tr> <td>programNumber</td> <td><b>xsd:unsignedShort</b></td> <td>optional</td> <td></td> <td></td> <td>documentation MPEG-2 program number used</td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	channelNumber	<a href="#">channelNumberType</a>	optional			documentation Two-part or one-part channel number of the virtual channel	tsid	<b>xsd:unsignedShort</b>	optional			documentation TSID of the carrying transport stream (A/65B 6.3)	network	<b>xsd:unsignedShort</b>	optional			documentation Network identifier, used when the TSID is not unique in the system	programNumber	<b>xsd:unsignedShort</b>	optional			documentation MPEG-2 program number used
Name	Type	Use	Default	Fixed	Annotation																										
channelNumber	<a href="#">channelNumberType</a>	optional			documentation Two-part or one-part channel number of the virtual channel																										
tsid	<b>xsd:unsignedShort</b>	optional			documentation TSID of the carrying transport stream (A/65B 6.3)																										
network	<b>xsd:unsignedShort</b>	optional			documentation Network identifier, used when the TSID is not unique in the system																										
programNumber	<b>xsd:unsignedShort</b>	optional			documentation MPEG-2 program number used																										

sourceId	<b>xsd:unsignedShort</b>	optional	by the virtual channel (A/65B 6.3) documentation PSIP source_id (A/65B 6.3)
status	<a href="#">channelStatusType</a>	optional	documentation Current activity status of the channel (A/65B 6.3 hidden and hide_guide)
type	<a href="#">serviceType</a>	optional	documentation Type of the primary service provided by the channel: TV, radio or data (A/65B 6.3 service_type)
ca	<b>xsd:boolean</b>	optional	documentation Specifies if this channel is partly or completely encrypted and access-controlled (A/65B 6.3 access_controlled)
shortName	<a href="#">shortNameType</a>	optional	documentation PSIP short name (7 characters max.) (A/65B 6.3)
outOfBand	<b>xsd:boolean</b>	optional	documentation When true, signals that the PSIP data is not carried in the same physical channel as the virtual channel itself (A/65B 6.3.2)
pmtPid	<a href="#">pidType</a>	optional	documentation PID used to carry the MPEG-2 PMT of the channel (A/53B 5.4)
pcrPid	<a href="#">pidType</a>	optional	documentation PID used to carry the PCR fields of the channel, same as video PID per ATSC rules (A/53B 5.4)
action	<a href="#">actionType</a>	optional	
error	<a href="#">errorType</a>	optional	

annotation	documentation Describes an ATSC "Virtual Channel", equivalent to an MPEG-2 "program"
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### element ChannelType/Name

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Long name of the channel, potentially for multiple languages (A/65B 6.9.5)					

### element ChannelType/Description

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Multiple-language description of the channel carried in the channel ETT (A/65B 6.6)					

### element ChannelType/ElementaryStream

type	<a href="#">ElementaryStreamType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Name</a> <a href="#">ConditionalAccess</a> <a href="#">CarouselIdentifier</a> <a href="#">ApplicationSignaling</a> <a href="#">DataBroadcastId</a> <a href="#">StreamIdentifier</a> <a href="#">AssociationTag</a> <a href="#">PmtPrivateInformation</a> <a href="#">PmtDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	pid	<a href="#">pidType</a>	required			documentation PID used to carry the elementary stream
	type	xsd:unsignedByte	optional			documentation stream_type as defined by MPEG-2 and ATSC and carried in the PMT and service location descriptor
	audiold	<a href="#">audioldType</a>	optional			documentation ID of an audio stream in a channel. Links to an Ac3Audio element.

	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional
annotation	documentation Description of the elementary streams that make up the channel, as carried in the service location descriptor of the VCT (A/65B 6.9.6) and in the PMT (A/53B 5.4)		

#### element **ChannelType/ParentalRating**

type	<a href="#">ParentalRatingType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Null Rating</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	region	<b>xsd:unsignedByte</b>	required			documentation Rating region, as defined by the ATSC Code Point Registry
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Current parental ratings of the channel. Overrides the value set for the current event.					

#### element **ChannelType/Audios**

type	<a href="#">AudiosType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Null Ac3Audio</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Current audio configuration of the channel. Overrides the value set for the current event.					

#### element **ChannelType/Captions**

type	<a href="#">CaptionsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Null Caption608</a> <a href="#">Caption708</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Current caption services of the channel. Overrides the value set for the current event.					

#### element **ChannelType/RedistributionControl**

type	<a href="#">RedistributionControlType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				

	content	complex				
children	<a href="#">Null</a>					
attributes	Name action error	Type <a href="#">actionType</a> <a href="#">errorType</a>	Use optional optional	Default	Fixed	Annotation
annotation	documentation Current "broadcast flag" of the channel. Overrides the value set for the current event.					

#### element **ChannelType/TimeShiftedService**

type	<a href="#">TimeShiftedServiceType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Copy</a>					
attributes	Name action error	Type <a href="#">actionType</a> <a href="#">errorType</a>	Use optional optional	Default	Fixed	Annotation
annotation	documentation Signals that this channel has time shifted copies					

#### element **ChannelType/ConditionalAccess**

type	<a href="#">ConditionalAccessType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name systemId  pid  action error	Type <b>xsd:unsignedS hort</b>  <a href="#">pidType</a>  <a href="#">actionType</a> <a href="#">errorType</a>	Use required  optional  optional optional	Default	Fixed	Annotation documentation Conditional access system ID documentation EMM or ECM PID, depending on context
annotation	documentation Defines the CA systems in use in this channel and the corresponding ECM PIDs					

#### element **ChannelType/DeferredAssociationTags**

type	<a href="#">DeferredAssociationTagsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">AssociationTags</a>					
attributes	Name programNumber	Type <b>xsd:unsignedS hort</b>	Use required	Default	Fixed	Annotation documentation service_id of the service that is associated with enlisted association tags



	tsid <b>xsd:unsignedShort</b> optional  action error <a href="#">actionType</a> optional <a href="#">errorType</a> optional	documentation TSID of the transport stream in which the MPEG-2 Program resides that contains the PIDs that are associated with the enlisted association tags
annotation	documentation This descriptor is present, if the stream object is bound to elementary streams of other services, (A/101 10.6.2.1)	

**element ChannelType/PmtPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name formatIdentifier	Type <b>xsd:unsignedInt</b>	Use required	Default	Fixed	Annotation documentation Format Identifier registered by SMPTE
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation These descriptors go into the outer loop of the PMT					

**element ChannelType/VctPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name formatIdentifier	Type <b>xsd:unsignedInt</b>	Use required	Default	Fixed	Annotation documentation Format Identifier registered by SMPTE
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation These descriptors go into the inner loop of the VCT					

**element ChannelType/PmtDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				

	minOcc 0 maxOcc unbounded content complex						
attributes	Name descriptorTag	Type <b>xsd:unsignedByte</b>	Use required	Default	Fixed	Annotation documentation Descriptor tag	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation These descriptors go into the outer loop of the PMT						

### element **ChannelType/VctDescriptor**

type	<a href="#">DescriptorType</a>						
properties	isRef 0 minOcc 0 maxOcc unbounded content complex						
attributes	Name descriptorTag	Type <b>xsd:unsignedByte</b>	Use required	Default	Fixed	Annotation documentation Descriptor tag	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation These descriptors go into the inner loop of the VCT						

### element **ChannelType/PrivatePmcplInformation**

type	<a href="#">PrivatePmcplInformationType</a>						
properties	isRef 0 minOcc 0 maxOcc 1 content complex						
annotation	documentation Channel-level PMCP-private information						

### complexType **DeferredAssociationTagsType**

children	<a href="#">AssociationTags</a>						
used by	element <a href="#">ChannelType/DeferredAssociationTags</a>						
attributes	Name programNumber	Type <b>xsd:unsignedShort</b>	Use required	Default	Fixed	Annotation documentation service_id of the service that is associated with enlisted association tags documentation TSID of the transport stream in which the MPEG-2 Program resides that contains the PIDs that are associated with the enlisted association	
	tsid	<b>xsd:unsignedShort</b>	optional				

	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional	tags
annotation	documentation Deferred Association Tags Descriptor (A/101 10.6.2.1)			

#### element **DeferredAssociationTagsType/AssociationTags**

type	<a href="#">AssociationTagsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	associationTag	<a href="#">xsd:unsignedShort</a>	required			documentation Identifies the connection on which the DII message is broadcast
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation List of deferred association tags					

#### complexType **TimeShiftedServiceType**

children	<a href="#">Copy</a>					
used by	element	<a href="#">ChannelType/TimeShiftedService</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Time Shifted Service Descriptor (A/65B 6.9.7)					

#### element **TimeShiftedServiceType/Copy**

type	<a href="#">ChannelCopyType</a>					
properties	isRef	0				
	minOcc	1				
	maxOcc	20				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	timeShift	<a href="#">xsd:duration</a>	required			documentation Delay compared to the reference channel
	channel	<a href="#">channelNumberType</a>	required			documentation Channel number of the time-shifted copy
annotation	documentation Time shifted service					

#### simpleType **channelStatusType**

type	restriction of <a href="#">xsd:string</a>				
used by	attribute	<a href="#">ChannelType/@status</a>			

facets	enumeration active enumeration inactive enumeration hidden
annotation	documentation Channel activity status (A/65B 6.3 hidden and hide_guide)

simpleType **serviceType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">ChannelType/@type</a>
facets	enumeration analog_television enumeration digital_television enumeration digital_radio enumeration data_broadcast
annotation	documentation Type of the primary service provided by the channel: TV, radio or data (A/65B 6.3 service_type)

simpleType **shortNameType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">ChannelType/@shortName</a>
facets	maxLength 7
annotation	documentation PSIP short name (7 characters max.) (A/65B 6.3)

complexType **DataIdType**

children	<a href="#">Current</a> <a href="#">Default</a> <a href="#">PmcpDataId</a> <a href="#">InitialSchedule</a> <a href="#">PspDataId</a> <a href="#">InitialSchedule</a> <a href="#">PspDataId</a> <a href="#">PspDataId</a>					
used by	element <a href="#">PspDataEventType/DataId</a>					
attributes	Name channelNumber	Type <a href="#">channelNumberType</a>	Use required	Default	Fixed	Annotation documentation Channel number of the channel that carries the data event
	tsid	<b>xsd:unsignedShort</b>	optional			documentation TSID of the transport stream that carries the data event, used if the channel number is not unique in the system
	network	<b>xsd:unsignedShort</b>	optional			documentation Network identifier of the channel that carries the data event, used when the TSID is not unique in the system
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Data event Identification. Provides several mechanisms for labeling and referencing events.					

**element DataIdType/Current**

properties	isRef 0
annotation	documentation References the current data event of the channel, when no other identification method is known

**element DataIdType/Default**

properties	isRef 0
annotation	documentation References the default data event of the channel, used by the PSIP Generator when no other data event information is known about a time slot

**element DataIdType/PmcpDataId**

type	<a href="#">PmcpEventIdType</a>					
properties	isRef 0	content complex				
attributes	Name creator	Type <b>xsd:string</b>	Use required	Default	Fixed	Annotation documentation Device name of the initial event creator
	id	<b>xsd:unsignedInt</b>	required			documentation Number assigned by the creator
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Unique data event identifier assigned by the creator of an data event. Preferred referencing method					

**element DataIdType/InitialSchedule**

type	<a href="#">InitialScheduleType</a>					
properties	isRef 0	minOcc 0	maxOcc 1	content complex		
attributes	Name startTime	Type <b>xsd:dateTime</b>	Use required	Default	Fixed	Annotation documentation Start time initially scheduled for the event.
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			

**element DataIdType/PsipDataId**

type	<a href="#">PspidDataIdType</a>					
properties	isRef 0	minOcc 0	maxOcc 1	content complex		
attributes	Name dataId	Type <a href="#">psipEventIdType</a>	Use required	Default	Fixed	Annotation documentation Data_id as defined by A/90 and

	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				carried in the DET
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**element DataIdType/InitialSchedule**

type	<a href="#">InitialScheduleType</a>						
properties	isRef	0					
	content	complex					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	startTime	<a href="#">xsd:dateTime</a>	required			documentation Start time initially scheduled for the event.	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Communicates the initial scheduled start time. May be used to reference an event when no other ID is known.						

**element DataIdType/PsipDataId**

type	<a href="#">PspidDataIdType</a>						
properties	isRef	0					
	minOcc	0					
	maxOcc	1					
	content	complex					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	dataId	<a href="#">psipEventIdType</a> <a href="#">e</a>	required			documentation Data_id as defined by A/90 and carried in the DET	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				

**element DataIdType/PsipDataId**

type	<a href="#">PspidDataIdType</a>						
properties	isRef	0					
	content	complex					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	dataId	<a href="#">psipEventIdType</a> <a href="#">e</a>	required			documentation Data_id as defined by A/90 and carried in the DET	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation PSIP data ID assigned and broadcast by the PSIP Generator in the DETs (A/90 11.3)						

**complexType EventIdType**

children	<a href="#">Current</a> <a href="#">Default</a> <a href="#">PmcpEventId</a> <a href="#">InitialSchedule</a> <a href="#">PspidEventId</a> <a href="#">InitialSchedule</a> <a href="#">PspidEventId</a> <a href="#">PspidEventId</a>						
used by	element	<a href="#">PspidEventType/EventId</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	channelNumber	<a href="#">channelNumbe</a>	required			documentation	

	<p><a href="#">rType</a></p> <p>tsid      <b>xsd:unsignedShort</b>      optional</p> <p>network      <b>xsd:unsignedShort</b>      optional</p> <p>action      <a href="#">actionType</a>      optional  error      <a href="#">errorType</a>      optional</p>	<p>Channel number of the channel that carries the event</p> <p>documentation  TSID of the transport stream that carries the event, used if the channel number is not unique in the system</p> <p>documentation  Network identifier of the channel that carries the event, used when the TSID is not unique in the system</p>
annotation	documentation Event Identification. Provides several mechanisms for labeling and referencing events.	

**element EventType/Current**

properties	isRef 0
annotation	documentation References the current event of the channel, when no other identification method is known

**element EventType/Default**

properties	isRef 0
annotation	documentation References the default event of the channel, used by the PSIP Generator when no other event information is known about a time slot

**element EventType/PmcpEventId**

type	<a href="#">PmcpEventType</a>					
properties	isRef 0	content complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	creator	<b>xsd:string</b>	required			documentation Device name of the initial event creator
	id	<b>xsd:unsignedInt</b>	required			documentation Number assigned by the creator
action error		<a href="#">actionType</a>	optional			
		<a href="#">errorType</a>	optional			
annotation	documentation Unique event identifier assigned by the creator of an event. Preferred referencing method					

element **EventIdType/InitialSchedule**

type	<a href="#">InitialScheduleType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation Start time initially scheduled for the event.
	startTime	<a href="#">xsd:dateTime</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			

element **EventIdType/PsipEventId**

type	<a href="#">PsipEventIdType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation Event_id as defined by PSIP and carried in the EIT
	eventId	<a href="#">psipEventIdType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			

element **EventIdType/InitialSchedule**

type	<a href="#">InitialScheduleType</a>					
properties	isRef	0				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation Start time initially scheduled for the event.
	startTime	<a href="#">xsd:dateTime</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Communicates the initial scheduled start time. May be used to reference an event when no other ID is known.					

element **EventIdType/PsipEventId**

type	<a href="#">PsipEventIdType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation Event_id as defined by PSIP and
	eventId	<a href="#">psipEventIdType</a>	required			



	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional	carried in the EIT
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### element **EventIdType/PsipEventId**

type	<a href="#">PspidEventIdType</a>					
properties	isRef	0	content	complex		
attributes	Name eventId	Type <a href="#">psipEventIdType</a>	Use required	Default	Fixed	Annotation documentation Event_id as defined by PSIP and carried in the EIT
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation PSIP event ID assigned and broadcast by the PSIP Generator in the EITs (A/65B 6.5)					

### complexType **InitialScheduleType**

used by	elements	<a href="#">EventIdType/InitialSchedule</a>	<a href="#">EventIdType/InitialSchedule</a>	<a href="#">DataIdType/InitialSchedule</a>		
attributes	Name startTime	Type <b>xsd:dateTime</b>	Use required	Default	Fixed	Annotation documentation Start time initially scheduled for the event.
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Communicates the initial scheduled start time. May be used to reference an event when no other ID is known.					

### complexType **PmcpEventIdType**

used by	elements	<a href="#">DataIdType/PmcpDataId</a>	<a href="#">EventIdType/PmcpEventId</a>			
attributes	Name creator	Type <b>xsd:string</b>	Use required	Default	Fixed	Annotation documentation Device name of the initial event creator
	id	<b>xsd:unsignedInt</b>	required	documentation Number assigned by the creator		
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Unique event identifier assigned by the creator of an event. Preferred referencing method					

### complexType **PsipDataEventType**

children	<a href="#">DataId</a> <a href="#">AcapContentId</a> <a href="#">Name</a> <a href="#">Description</a> <a href="#">DataBroadcast</a> <a href="#">DetPrivateInformation</a> <a href="#">DetDescriptor</a> <a href="#">PrivatePmcpInformation</a>					
used by	element	<a href="#">PmcpMessage/PsipDataEvent</a>				
attributes	Name startTime	Type <b>xsd:dateTime</b>	Use optional	Default	Fixed	Annotation documentation Actual start

	<p>duration      <b>xsd:duration</b>      optional</p> <p>alternateScheduleNumber      <b>xsd:positiveInteger</b>      optional</p> <p>fromStart      <b>xsd:duration</b>      optional</p> <p>essenceSource      <b>xsd:string</b>      optional</p> <p>action error      <a href="#">actionType</a>      optional  <a href="#">errorType</a>      optional</p>	<p>time of the data event (A/90 11.3), when different from the scheduled start time</p> <p>documentation Duration of the data event (A/90 11.3)</p> <p>documentation Indicates that the data event is part of an alternate schedule and is not carried in PSIP</p> <p>documentation Indicates the offset between the beginning of the material and the beginning of the data event. Not carried in PSIP.</p> <p>documentation Not carried in PSIP. Indicates where the essence comes from or how it is generated. Communicates implicit authority. The allowed values are defined during the setup process.</p>
annotation	documentation Describes a PSIP "Data event", i.e. an element of the data program guide.	

element **PsipDataEventType/DataId**

type	<a href="#">DataIdType</a>					
properties	isRef	0				
	content	complex				
children	<a href="#">Current</a> <a href="#">Default</a> <a href="#">PmcpDataId</a> <a href="#">InitialSchedule</a> <a href="#">PsipDataId</a> <a href="#">InitialSchedule</a> <a href="#">PsipDataId</a> <a href="#">PsipDataId</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	channelNumber	<a href="#">channelNumberType</a>	required			documentation Channel number of the channel that carries the data event
	tsid	<b>xsd:unsignedShort</b>	optional			documentation TSID of the transport stream that

	<p>network                    <b>xsd:unsignedShort</b>    optional</p> <p>action                    <a href="#">actionType</a>            optional</p> <p>error                      <a href="#">errorType</a>              optional</p>	<p>carries the data event, used if the channel number is not unique in the system</p> <p>documentation Network identifier of the channel that carries the data event, used when the TSID is not unique in the system</p>
annotation	<p>documentation Allows referencing a data event using one or more methods</p>	

**element PsipDataEventType/AcapContentId**

type	<a href="#">ContentIdType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Isan</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">Alternateld</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation References a show or specifies the content ID of the data event					

**element PsipDataEventType/Name**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Multiple-language title of the data event (A/90 11.3)					

**element PsipDataEventType/Description**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Multiple-language description of the data event carried in the data event ETT (A/90 11.4)					

element **PsipDataEventType/DataBroadcast**

type	<a href="#">DataBroadcastType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Description</a> <a href="#">ObjectName</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	dataBroadcastId	<b>xsd:unsignedShort</b>	optional			documentation Identifies the data broadcast specification that is used to broadcast the data in the broadcast network
	componentTag	<b>xsd:unsignedByte</b>	optional			documentation Identifies the component stream for associating it
	carouselTypeId	<a href="#">carouselTypeIdType</a>	optional			documentation Indicates which kind of carousel is used
	transactionId	<b>xsd:unsignedInt</b>	optional			documentation Indicates the same value as the transactionId value of the DownloadServiceInitiate message that carries the object reference of the service gateway
	time_out_value_DSI	<b>xsd:unsignedShort</b>	optional			documentation Indicates the recommended time out period in milliseconds that receivers should use to time out the acquisition of the DownloadServiceInitiate message
time_out_value_DII	<b>xsd:unsignedShort</b>	optional			documentation Indicates the recommended time out period in milliseconds that receivers should use to time out the acquisition of the DownloadInfo	

	leakRate <a href="#">leakRateType</a> optional  action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	ndication message documentation Indicates the leak rate Rxn of the data carousel decoder model that is applied by the service
annotation	documentation Data Broadcasting Descriptor	

**element PsipDataEventType/DetPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	xsd:unsignedInt	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the data event loop of the DET					

**element PsipDataEventType/DetDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	xsd:unsignedByte	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the data event loop of the DET					

**element PsipDataEventType/PrivatePmcplInformation**

type	<a href="#">PrivatePmcplInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
annotation	documentation Data event-level PMCP-private information					

complexType **PsipDataIdType**

used by	elements <a href="#">DataIdType/PsipDataId</a> <a href="#">DataIdType/PsipDataId</a> <a href="#">DataIdType/PsipDataId</a>					
attributes	Name dataId	Type <a href="#">psipEventIdType</a>	Use required	Default	Fixed	Annotation documentation Data_id as defined by A/90 and carried in the DET
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			

complexType **PsipEventIdType**

used by	elements <a href="#">EventIdType/PsipEventId</a> <a href="#">EventIdType/PsipEventId</a> <a href="#">EventIdType/PsipEventId</a>					
attributes	Name eventId	Type <a href="#">psipEventIdType</a>	Use required	Default	Fixed	Annotation documentation Event_id as defined by PSIP and carried in the EIT
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			

complexType **PsipEventType**

children	<a href="#">EventId</a> <a href="#">ContentId</a> <a href="#">AcapContentId</a> <a href="#">ShowData</a> <a href="#">EitPrivateInformation</a> <a href="#">EitDescriptor</a> <a href="#">PrivatePmcpInformation</a>					
used by	element <a href="#">PmcpMessage/PsipEvent</a>					
attributes	Name startTime	Type <b>xsd:dateTime</b>	Use optional	Default	Fixed	Annotation documentation Actual start time of the event (A/65B 6.5), when different from the scheduled start time
	startFrame	<b>xsd:unsignedByte</b>	optional			documentation Frame count for the actual start time of the event, when a one-second accuracy is not sufficient.
	duration	<b>xsd:duration</b>	optional			documentation Duration of the event (A/65B 6.5)
	durationFrame	<b>xsd:unsignedByte</b>	optional			documentation Additional frames for the actual duration of the event, when a one-second accuracy is not sufficient.
	alternateScheduleNumber	<b>xsd:positiveInteger</b>	optional			documentation Indicates that

	<p>fromStart      <b>xsd:duration</b>      optional</p> <p>fromStartFrame      <b>xsd:unsignedByte</b>      optional</p> <p>essenceSource      <b>xsd:string</b>      optional</p> <p>action error      <a href="#">actionType</a>      optional</p> <p>                         <a href="#">errorType</a>      optional</p>	<p>the event is part of an alternate schedule and is not carried in PSIP</p> <p>documentation Indicates the offset between the beginning of the material and the beginning of the event, e.g. the tape or the file. Not carried in PSIP.</p> <p>documentation Additional frames for the material offset, when a one-second accuracy is not sufficient.</p> <p>documentation Not carried in PSIP. Indicates where the essence comes from or how it is generated. Communicates implicit authority. The allowed values are defined during the setup process.</p>
annotation	documentation	Describes a PSIP "Event", i.e. an element of the program guide.

**element PsipEventType/EventId**

type	<a href="#">EventIdType</a>					
properties	isRef	0	content	complex		
children	<a href="#">Current</a> <a href="#">Default</a> <a href="#">PmcpEventId</a> <a href="#">InitialSchedule</a> <a href="#">PsipEventId</a> <a href="#">InitialSchedule</a> <a href="#">PsipEventId</a> <a href="#">PsipEventId</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	channelNumber	<a href="#">channelNumberType</a>	required			documentation Channel number of the channel that carries the event
	tsid	<b>xsd:unsignedShort</b>	optional			documentation TSID of the transport stream that carries the event, used if the channel number is not

	<p>network                    <b>xsd:unsignedShort</b>    optional</p> <p>action                    <a href="#">actionType</a>            optional</p> <p>error                    <a href="#">errorType</a>            optional</p>	<p>unique in the system documentation Network identifier of the channel that carries the event, used when the TSID is not unique in the system</p>
annotation	<p>documentation Allows referencing an event using one or more methods</p>	

**element PsipEventType/ContentId**

type	<a href="#">ContentIdType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Isan</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">Alternateld</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation References a show or specifies the content ID of the event					

**element PsipEventType/AcapContentId**

type	<a href="#">ContentIdType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Isan</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">Alternateld</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation References a show or specifies the content ID of the data event					

**element PsipEventType/ShowData**

type	<a href="#">ShowDataType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Name</a> <a href="#">Description</a> <a href="#">ParentalRating</a> <a href="#">Audios</a> <a href="#">Captions</a> <a href="#">RedistributionControl</a> <a href="#">DataBroadcast</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Show information of the PSIP event					



element **PsipEventType/EitPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the event loop of the EIT (A/65B 6.5)					

element **PsipEventType/EitDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the event loop of the EIT (A/65B 6.5)					

element **PsipEventType/PrivatePmcpInformation**

type	<a href="#">PrivatePmcpInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
annotation	documentation Event-level PMCP-private information					

simpleType **psipEventIdType**

type	restriction of <b>xsd:unsignedShort</b>					
used by	attributes	<a href="#">PsipDataIdType/@dataId</a> <a href="#">PsipEventIdType/@eventId</a>				
facets	maxExclusive	16384				
annotation	documentation Type for a PSIP Event_id					

complexType **TimeParametersType**

children	<a href="#">SttPrivateInformation</a> <a href="#">SttDescriptor</a>					
used by	element	<a href="#">PmcpMessage/TimeParameters</a>				

attributes	Name	Type	Use	Default	Fixed	Annotation
	gpsUtcOffset	<b>xsd:unsignedByte</b>	optional			documentation Current GPS UTC offset, as published by the International Earth Rotation Service (A/65B 6.1)
	dsStatus	<b>xsd:boolean</b>	optional			documentation Current daylight savings status (A/65B 6.1 and Annex A)
	dsDayOfMonth	<a href="#">dsDayOfMonthType</a>	optional			documentation If DST is to change within a month, day of change (A/65B 6.1 and Annex A)
	dsHour	<a href="#">dsHourType</a>	optional			documentation If DST is to change within a month, hour of change (A/65B 6.1 and Annex A)
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Declares the parameters that go into the System Time Table (A/65B 6.1), except for the time itself, which is communicated through other means					

### element **TimeParametersType/SttPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation These descriptors go into the STT					

### element **TimeParametersType/SttDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag

	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional
annotation	documentation These descriptors go into the STT		

**simpleType dsDayOfMonthType**

type	restriction of <code>xsd:unsignedByte</code>		
used by	attribute	<a href="#">TimeParametersType/@dsDayOfMonth</a>	
facets	maxInclusive	31	
annotation	documentation Number of day in month (A/65B 6.1 and Annex A)		

**simpleType dsHourType**

type	restriction of <code>xsd:unsignedByte</code>		
used by	attribute	<a href="#">TimeParametersType/@dsHour</a>	
facets	maxInclusive	18	
annotation	documentation Hour of the day (A/65B 6.1 and Annex A)		

**complexType AcapApplicationType**

children	<a href="#">Application</a> <a href="#">TransportProtocol</a> <a href="#">DiiLocation</a> <a href="#">AitPrivateInformation</a> <a href="#">AitDescriptor</a>					
used by	element	<a href="#">AcapDataServiceType/AcapApplication</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	applicationType	<a href="#">applicationType</a> <a href="#">eType</a>	required			documentation Type of the application described in this AIT sub_table
	testApplicationFlag	<code>xsd:boolean</code>	optional			documentation The value can be one, which Indicates a test application
annotation	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Description of the Information about AIT (A/101 10.6.3)					

**element AcapApplicationType/Application**

type	<a href="#">ApplicationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Name</a> <a href="#">ApplicationInfo</a> <a href="#">Icon</a> <a href="#">Prefetch</a> <a href="#">DiiLocation</a> <a href="#">AcapJApp</a> <a href="#">AcapJAppLocation</a> <a href="#">AcapXApp</a> <a href="#">AcapXAppLocation</a> <a href="#">AcapXAppBoundary</a> <a href="#">AitPrivateInformation</a> <a href="#">AitDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	organizationId	<code>xsd:unsignedInt</code>	required			documentation A globally unique value identifying the organization

	<p>applicationId      <b>xsd:unsignedShort</b>      required</p> <p>controlCode      <a href="#">controlCodeType</a>      optional</p> <p>action error      <a href="#">actionType</a>      optional</p> <p>                     <a href="#">errorType</a>      optional</p>	<p>that is responsible for the application documentation uniquely identifies the application function documentation controls the state of the application</p>
annotation	documentation Specific information of each applications	

element **AcapApplicationType/TransportProtocol**

type	<a href="#">TransportProtocolType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	protocolLabel	<b>xsd:unsignedByte</b>	required			documentation unique identifier for a transport protocol within this AIT
	remoteConnection	<b>xsd:boolean</b>	optional			documentation indicates that the transport connection is provided by a service that is different to the one carrying the AIT
	sourceId	<b>xsd:unsignedShort</b>	optional			documentation SourceId resolves to a virtual channel
	componentTag	<b>xsd:unsignedByte</b>	optional			documentation Indication the elementary stream that carries the DSI of the object carousel
	action error	<a href="#">actionType</a>	optional			
		<a href="#">errorType</a>	optional			
annotation	documentation Information about the transport protocol associated with a service component (A/101 10.6.3.1.1)					

element **AcapApplicationType/DiiLocation**

type	<a href="#">DiiLocationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">DiiList</a>					

attributes	Name	Type	Use	Default	Fixed	Annotation documentation unique identifier for a transport protocol within this AIT
	protocollabel	<b>xsd:unsignedByte</b>	optional			
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Listing the locations of DII messages associated with the object carousel (A/101 10.6.3.2)					

### element **AcapApplicationType/AitPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation Format Identifier registered by SMPTE
	formatIdentifier	<b>xsd:unsignedInt</b>	required			
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation These descriptors go into the outer loop of the AIT (A/101 10.6.3.1)					

### element **AcapApplicationType/AitDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation Descriptor tag
	descriptorTag	<b>xsd:unsignedByte</b>	required			
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation These descriptors go into the outer loop of the AIT (A/101 10.6.3.1)					

### complexType **AcapDataServiceType**

children	<a href="#">AcapContentId</a> <a href="#">AcapApplication</a> <a href="#">AcapObjectCarousel</a> <a href="#">PrivatePmcpInformation</a>					
used by	element	<a href="#">PmcpMessage/AcapDataService</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Information about the transport protocol associated with ACAP data broadcast service					

### element **AcapDataServiceType/AcapContentId**

type	<a href="#">ContentIdType</a>					
properties	isRef	0				

	content	complex				
children	<a href="#">Isan</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">HouseNumber</a> <a href="#">Alternateld</a> <a href="#">Alternateld</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation References a ACAP data broadcasting service					

#### element **AcapDataServiceType/AcapApplication**

type	<a href="#">AcapApplicationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Application</a> <a href="#">TransportProtocol</a> <a href="#">DiiLocation</a> <a href="#">AitPrivateInformation</a> <a href="#">AitDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	applicationType	<a href="#">applicationType</a> <a href="#">eType</a>	required			documentation Type of the application described in this AIT sub_table
	testApplicationFlag	xsd:boolean	optional			documentation The value can be one, which Indicates a test application
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Describes the information about AIT					

#### element **AcapDataServiceType/AcapObjectCarousel**

type	<a href="#">AcapObjectCarouselType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">DataCarousel</a> <a href="#">ObjectCarousel</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	carouselId	xsd:unsignedInt	required			documentation Identification of the data carousel
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Describes the information about Object Carousel					

#### element **AcapDataServiceType/PrivatePmcpInformation**

type	<a href="#">PrivatePmcpInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
annotation	documentation Acap data service-level PMCP-private information					

**complexType AcapJAppLocationType**

used by	element <a href="#">ApplicationType/AcapJAppLocation</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	baseDirectory	<b>xsd:string</b>	optional			documentation Representing the base directory
	classpathExtension	<b>xsd:string</b>	optional			documentation The string that specifies the alternative locations for the classpath
	initialClass	<b>xsd:string</b>	optional			documentation The parameter string that the receiver appends to the initial path
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation ACAP-J Application Location Descriptor (A/101 10.6.5.1.2)					

**complexType AcapJAppType**

used by	element <a href="#">ApplicationType/AcapJApp</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	parameter	<b>xsd:string</b>	optional			documentation Startup parameter string (UTF-8 encoding)
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation ACAP-J Application Descriptor (A/101 10.6.5.1.1)					

**complexType AcapObjectCarouselType**

children	<a href="#">DataCarousel</a> <a href="#">ObjectCarousel</a>					
used by	element <a href="#">AcapDataServiceType/AcapObjectCarousel</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	carouselId	<b>xsd:unsignedInt</b>	required			documentation Identification of the data carousel
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Description of ACAP Object Carousel					

**element AcapObjectCarouselType/DataCarousel**

type	<a href="#">DataCarouselType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				

children	<a href="#">Dsi Dii PidList</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
annotation	error	<a href="#">errorType</a>	optional			
	documentation Information about Data Carousel that carries BIOP messages in Modules					

### element [AcapObjectCarouselType/ObjectCarousel](#)

type	<a href="#">ObjectCarouselType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">ServiceGateway</a> <a href="#">Directory</a> <a href="#">File</a> <a href="#">Stream</a> <a href="#">StreamEvent</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
annotation	error	<a href="#">errorType</a>	optional			
	documentation Information about BIOP messages of Object Carousel					

### complexType [AcapXAppBoundaryType](#)

used by	element	<a href="#">ApplicationType/AcapXAppBoundary</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	label	<b>xsd:string</b>	required			documentation match the label in DII
	regularExpression	<b>xsd:string</b>	optional			documentation String that specifies a regular expression (UTF-8 encoding)
	action	<a href="#">actionType</a>	optional			
annotation	error	<a href="#">errorType</a>	optional			
	documentation ACAP-X Application Boundary Descriptor (A/101 10.3.4.3)					

### complexType [AcapXAppLocationType](#)

used by	element	<a href="#">ApplicationType/AcapXAppLocation</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	physicalRoot	<b>xsd:string</b>	optional			documentation String that specifies the path to the root directory of the application (UTF-8 encoding)
annotation	initialPath	<b>xsd:string</b>	optional			documentation String that specifies the relative path to either the ACAP-X application Metadata Resource(ARM) file or the



	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	ACAP-X initial entity (i.e. XDML Family Document)
annotation	documentation ACAP-X Application Location Descriptor (A/101 10.3.4.2)	

**complexType AcapXAppType**

used by	element <a href="#">ApplicationType/AcapXApp</a>					
attributes	Name parameter	Type <b>xsd:string</b>	Use optional	Default	Fixed	Annotation documentation Startup parameter string (UTF-8 encoding)
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation ACAP-X Application Descriptor (A/101 10.3.4.1)					

**complexType ApplicationInfoType**

children	<a href="#">Profiles ProtocolLabels</a>					
used by	element <a href="#">ApplicationType/ApplicationInfo</a>					
attributes	Name serviceBound	Type <b>xsd:boolean</b>	Use optional	Default	Fixed	Annotation documentation whether the application is only associated with the current service documentation specifies whether the application is suitable to be offered to the end-user for them to decide if the application should be launched documentation identifies a relative priority between the applications signaled in this service
	visibility	<a href="#">visibilityType</a>	optional			
	priority	<b>xsd:unsignedByte</b>	optional			
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Application Descriptor (ETSI TS 101 812 V1.3.1 10.7.3)					

**element ApplicationInfoType/Profiles**

type	<a href="#">ProfilesType</a>
properties	isRef 0

	minOcc 0 maxOcc unbounded content complex						
attributes	Name profile	Type <b>xsd:unsignedShort</b>	Use required	Default	Fixed	Annotation documentation Represent the application type specific profile	
	versionMajor	<b>xsd:unsignedByte</b>	optional			documentation Indicates the major sub-field of the profile version number	
	versionMinor	<b>xsd:unsignedByte</b>	optional			documentation Indicates the minor sub-field of the profile version number	
	versionMicro	<b>xsd:unsignedByte</b>	optional			documentation Indicates the micro sub-field of the profile version number	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Information about the application profile loop						

element **ApplicationInfoType/ProtocolLabels**

type	<a href="#">ProtocolLabelsType</a>						
properties	isRef 0 minOcc 0 maxOcc unbounded content complex						
attributes	Name protocolLabel	Type <b>xsd:unsignedByte</b>	Use required	Default	Fixed	Annotation documentation Identifies the transport protocol that delivers the application	
annotation	documentation Identifies the transport protocol that delivers the application						

complexType **ApplicationType**

children	<a href="#">Name</a> <a href="#">ApplicationInfo</a> <a href="#">Icon</a> <a href="#">Prefetch</a> <a href="#">DiiLocation</a> <a href="#">AcapJApp</a> <a href="#">AcapJAppLocation</a> <a href="#">AcapXApp</a> <a href="#">AcapXAppLocation</a> <a href="#">AcapXAppBoundary</a> <a href="#">AitPrivateInformation</a> <a href="#">AitDescriptor</a>						
used by	element	<a href="#">AcapApplicationType/Application</a>					
attributes	Name organizationId	Type <b>xsd:unsignedInt</b>	Use required	Default	Fixed	Annotation documentation A globally unique value identifying the organization that is responsible for the application	
	applicationId	<b>xsd:unsignedShort</b>	required			documentation uniquely	

	controlCode <a href="#">controlCodeType</a> optional <a href="#">pe</a> action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	identifies the application function documentation controls the state of the application
annotation	documentation Application loop information of the AIT (ETSI TS 101 812 V1.3.1 10.4.6)	

### element **ApplicationType/Name**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Name of the application (A/101 10.6.4.2)					

### element **ApplicationType/ApplicationInfo**

type	<a href="#">ApplicationInfoType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Profiles ProtocolLabels</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	serviceBound	<b>xsd:boolean</b>	optional			documentation whether the application is only associated with the current service documentation specifies whether the application is suitable to be offered to the end-user for them to decide if the application should be launched
	visibility	<a href="#">visibilityType</a>	optional			documentation Identifies a relative priority between the applications signaled in this service
	priority	<b>xsd:unsignedByte</b>	optional			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Generic information of the application (A/101 10.6.4.1)					

element **ApplicationType/Icon**

type	<a href="#">IconType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	locator	<b>xsd:string</b>	optional			documentation Indicates the icon locator string
	iconFlags	<a href="#">iconFlagsType</a>	optional			documentation Represents the icon size
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Information about the icons associated with the application (A/101 10.6.4.3)					

element **ApplicationType/Prefetch**

type	<a href="#">PrefetchType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Labels</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	protocolLabel	<b>xsd:unsignedByte</b>	optional			documentation Identifies the transport protocol descriptor that specifies the object carousel that delivers the modules to which this prefetch descriptor refers
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Information used for prefetching modules that have the indicated labels (Only for the case of object carousel used) (A/101 10.6.4.4)					

element **ApplicationType/DiiLocation**

type	<a href="#">DiiLocationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">DiiList</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	protocolLabel	<b>xsd:unsignedByte</b>	optional			documentation unique identifier for a transport protocol within

	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	this AIT
annotation	documentation Listing the locations of DII messages associated with the object carousel (A/101 10.6.4.5)	

### element **ApplicationType/AcapJApp**

type	<a href="#">AcapJAppType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	parameter	<b>xsd:string</b>	optional			documentation Startup parameter string (UTF-8 encoding)
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about the application startup parameter (A/101 10.6.5.1.1)					

### element **ApplicationType/AcapJAppLocation**

type	<a href="#">AcapJAppLocationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	baseDirectory	<b>xsd:string</b>	optional			documentation Representing the base directory
	classpathExtension	<b>xsd:string</b>	optional			documentation The string that specifies the alternative locations for the classpath
	initialClass	<b>xsd:string</b>	optional			documentation The parameter string that the receiver appends to the initial path
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information through which the implementation resolves the location of the ACAP-J application (A/101 10.6.5.1.2)					

### element **ApplicationType/AcapXApp**

type	<a href="#">AcapXAppType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	parameter	<b>xsd:string</b>	optional			documentation Startup parameter

	action error <a href="#">actionType</a> optional <a href="#">errorType</a> optional	string (UTF-8 encoding)
annotation	documentation Information about the application startup parameter (A/101 10.6.5.2.1)	

### element **ApplicationType/AcapXAppLocation**

type	<a href="#">AcapXAppLocationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	physicalRoot	<b>xsd:string</b>	optional			documentation String that specifies the path to the root directory of the application (UTF-8 encoding)
attributes	initialPath	<b>xsd:string</b>	optional			documentation String that specifies the relative path to either the ACAP-X application Metadata Resource(ARM) file or the ACAP-X initial entity (i.e. XDML Family Document)
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Information through which the implementation resolves the location of the ACAP-X application (A/101 10.6.5.2.2)					

### element **ApplicationType/AcapXAppBoundary**

type	<a href="#">AcapXAppBoundaryType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	label	<b>xsd:string</b>	required			documentation match the label in DII
attributes	regularExpression	<b>xsd:string</b>	optional			documentation String that specifies a regular expression (UTF-8 encoding)
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Information about regular expressions that define data elements that form the application (A/101 10.6.5.2.3)					

element **ApplicationType/AitPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the inner loop of the AIT (A/101 10.6.4, 10.6.5)					

element **ApplicationType/AitDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the inner loop of the AIT (A/101 10.6.4, 10.6.5)					

complexType **BindingsType**

children	<a href="#">BiopProfileBody</a> <a href="#">LiteOptionsProfileBody</a> <a href="#">HttpProfileBody</a> <a href="#">Label</a> <a href="#">MessagePrivateInformation</a> <a href="#">MessageDescriptor</a>					
used by	elements	<a href="#">ServiceGatewayType/Bindings</a> <a href="#">DirectoryType/Bindings</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this binding message
	kind	<b>xsd:string</b>	optional			documentation Indicates the kind of this binding message
	contentSize	<b>xsd:unsignedLong</b>	optional			documentation Indicates the content size of this file object
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation					

	Binding information between object messages
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element **BindingsType/BiopProfileBody**

type	<a href="#">BiopProfileBodyType</a>					
properties	isRef content	0 complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	carouselId	<b>xsd:unsignedInt</b>	optional			documentation Identification of the data carousel
	moduleId	<b>xsd:unsignedShort</b>	optional			documentation Identifier of the module in the carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	associationTag	<b>xsd:unsignedShort</b>	optional			documentation Identifies the PID that carries the elementary stream
	identification	<a href="#">identificationType</a>	optional			documentation The identification portion of the transactionId
	timeOut	<b>xsd:unsignedInt</b>	optional			documentation the time out period in microseconds that may be used to time out the acquisition of this message
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Information used for reference to a object within the same object carousel					

element **BindingsType/LiteOptionsProfileBody**

type	<a href="#">LiteOptionsProfileBodyType</a>					
properties	isRef content	0 complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	carouselId	<b>xsd:unsignedInt</b>	optional			documentation Identification of the data carousel
	sourceId	<b>xsd:unsignedShort</b>	optional			documentation PSIP source_id (A/65B 6.3)
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this binding message
	action	<a href="#">actionType</a>	optional			



	error	<a href="#">errorType</a>	optional			
annotation	documentation Information used for reference to object carried in other object carousel					

### element **BindingsType/HttpProfileBody**

type	<a href="#">HttpProfileBodyType</a>					
properties	isRef	0				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	hostData	<b>xsd:anyURI</b>	optional			documentation Indicates the fully qualified domain name, or the decimal shorthand(e.g "129.145.166.188")
	port	<b>xsd:unsignedShort</b>	optional	80		documentation Indicates the port at which the service side listens
	objectKey	<b>xsd:string</b>	optional			documentation Indicates the path that identifies the service side implementation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information for the location of the file content on the interaction channel					

### element **BindingsType/Label**

type	<a href="#">LabelType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	label	<b>xsd:string</b>	optional			documentation Indicates current module label
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about the label for File message which is binding in servicegateway message (A/101 10.4.2.2.1)					

### element **BindingsType/MessagePrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format

	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	Identifier registered by SMPTE
annotation	documentation These descriptors go into the Binding loop of the ServiceGateway or Directory Message (A/101 10.4.2.2, 10.4.4)	

element **BindingsType/MessageDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the Binding loop of the ServiceGateway or Directory Message (A/101 10.4.2.2, 10.4.4)					

complexType **BiopProfileBodyType**

used by	element	<a href="#">BindingsType/BiopProfileBody</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	carouselId	<b>xsd:unsignedInt</b>	optional			documentation Identification of the data carousel
	moduleId	<b>xsd:unsignedShort</b>	optional			documentation Identifier of the module in the carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	associationTag	<b>xsd:unsignedShort</b>	optional			documentation Identifies the PID that carries the elementary stream
	identification	<a href="#">identificationType</a>	optional			documentation The identification portion of the transactionId
	timeOut	<b>xsd:unsignedInt</b>	optional			documentation the time out period in microseconds that may be used to time out the acquisition of this message
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation BIOP Profile Body (ETSI TS 101 812 V1.3.1 B.2.3.7.1)					

**complexType CachingPriorityType**

used by	element <a href="#">ModuleType/CachingPriority</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	priorityValue	<b>xsd:unsignedByte</b>	optional			documentation Indicates the caching priority for the objects within this module
	transparencyLabel	<a href="#">transparencyLabelType</a>	optional			documentation Indicates transparency level of caching
annotation	action error	<a href="#">actionTypeError</a>	optional			
	documentation Caching Priority Descriptor (ETSI TS 101 812 V1.3.1 B.2.2.4.2)					

**complexType CompressedModuleType**

used by	element <a href="#">ModuleType/CompressedModule</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	compressionMethod	<b>xsd:unsignedByte</b>	optional			documentation compression algorithm defined in IETF RFC 1950
	originalSize	<b>xsd:unsignedInt</b>	optional			documentation the size of the data (in bytes) carried by the module before it was compressed
annotation	action error	<a href="#">actionTypeError</a>	optional			
	documentation Compressed Module Descriptor (ETSI TS 101 812 V1.3.1 B.2.9)					

**complexType ContentTypeType**

used by	element <a href="#">FileType/ContentType</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	contentTypeData	<b>xsd:string</b>	optional			documentation Indicates the MIME content type of the object
	transparencyLabel	<a href="#">transparencyLabelType</a>	optional			documentation Indicates transparency level of caching
annotation	action error	<a href="#">actionTypeError</a>	optional			
	documentation Content Type Descriptor (A/101 10.4.5.2.1)					

complexType **DataCarouselType**

children	<a href="#">Dsi Dii PidList</a>					
used by	element <a href="#">AcapObjectCarouselType/DataCarousel</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about Data Carousel that carries BIOP messages in Modules					

element **DataCarouselType/Dsi**

type	<a href="#">DsiType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">DsiPrivateInformation</a> <a href="#">DsiDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	moduleId	<b>xsd:unsignedShort</b>	optional			documentation Identification of the module within the data carousel that carries the service gateway object
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	associationTag	<b>xsd:unsignedShort</b>	optional			documentation Indication the elementary stream that carries the DII message
	timeOut	<b>xsd:unsignedInt</b>	optional			documentation the time out period in microseconds that may be used to time out the acquisition of the Download Server Initiate message
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about the Download Server Initiate message					

element **DataCarouselType/Dii**

type	<a href="#">DiiType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				

children	<a href="#">Module</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	Identification	<a href="#">identificationType</a>	required			documentation The identification portion of the transactionId documentation
	blockSize	xsd:unsignedShort	optional			documentation Length in bytes of the data in every block carried in the DownloadData Block messages, except for the last block of each module
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Information about the Download Info Indication message					

#### element [DataCarouselType/PidList](#)

type	<a href="#">PidListType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	associationTag	xsd:unsignedShort	required			documentation Identifies the PID that carries the elementary stream
	pid	<a href="#">pidType</a>	optional			documentation PID used to carry the data carousel
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation List of PIDs that carries the data carousel					

#### complexType [DiiListType](#)

used by	element	<a href="#">DiiLocationType/DiiList</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	identification	<a href="#">identificationType</a>	required			documentation The identification portion of the transactionId documentation
	associationTag	xsd:unsignedShort	required			documentation Identifies the connection (i.e. elementary stream) on which the DII message is broadcast

annotation	documentation Information about the DII message
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### complexType **DiiLocationType**

children	<a href="#">DiiList</a>					
used by	elements	<a href="#">AcapApplicationType/DiiLocation</a> <a href="#">ApplicationType/DiiLocation</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation unique identifier for a transport protocol within this AIT
	procollLabel	<b>xsd:unsignedByte</b>	optional			
attributes	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
	annotation	documentation DII Location Descriptor (ETSI TS 101 812 V1.3.1 10.8.3.3)				

### element **DiiLocationType/DiiList**

type	<a href="#">DiiListType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation The identification portion of the transactionId documentation Identifies the connection (i.e. elementary stream) on which the DII message is broadcast
	identification	<a href="#">identificationType</a>	required			
attributes	associationTag	<b>xsd:unsignedShort</b>	required			
	annotation	documentation Information about the DII message				

### complexType **DiiType**

children	<a href="#">Module</a>					
used by	element	<a href="#">DataCarouselType/Dii</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation documentation The identification portion of the transactionId documentation Length in bytes of the data in every block carried in the DownloadData Block messages,
	Identification	<a href="#">identificationType</a>	required			
attributes	blockSize	<b>xsd:unsignedShort</b>	optional			

	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	except for the last block of each module
annotation	documentation Download Info Indication message (A/101 10.5.2)	

element **DiiType/Module**

type	<a href="#">ModuleType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">ObjectList</a> <a href="#">CompressedModule</a> <a href="#">Label</a> <a href="#">CachingPriority</a> <a href="#">DiiPrivateInformation</a> <a href="#">DiiDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	moduleId	<b>xsd:unsignedShort</b>	required			documentation Identifier of the module in the carousel
	moduleSize	<b>xsd:unsignedInt</b>	optional			documentation Indicates the length in bytes of the current module
	moduleTimeOut	<b>xsd:unsignedInt</b>	optional			documentation Indicates the time out value in microseconds that may be used to time out the acquisition of all blocks of the module
	blockTimeOut	<b>xsd:unsignedInt</b>	optional			documentation Indicates the time out value in microseconds that may be used to time out the reception of the next block of the after a block has been acquired
	minBlockTime	<b>xsd:unsignedInt</b>	optional			documentation Indicates the minimum time period that exists between the delivery of two subsequent blocks of the described module
	associationTag	<b>xsd:unsignedShort</b>	optional			documentation Indication the elementary stream that carries the DDB message

	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional
annotation	documentation Module that is referenced in the DII message		

### complexType **DirectoryType**

children	<a href="#">Bindings</a>					
used by	element <a href="#">ObjectCarouselType/Directory</a>					
attributes	Name objectId	Type <b>xsd:unsignedLong</b>	Use required	Default	Fixed	Annotation documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this directory message, it is linked to pathName of the LiteOptionsProfileBody
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation BIOP Directory Message (A/101 10.4.3)					

### element **DirectoryType/Bindings**

type	<a href="#">BindingsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">BiopProfileBody</a> <a href="#">LiteOptionsProfileBody</a> <a href="#">HttpProfileBody</a> <a href="#">Label</a> <a href="#">MessagePrivateInformation</a> <a href="#">MessageDescriptor</a>					
attributes	Name objectId	Type <b>xsd:unsignedLong</b>	Use required	Default	Fixed	Annotation documentation Identification of the object in an object carousel
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this binding message
	kind	<b>xsd:string</b>	optional			documentation Indicates the kind of this binding message



	contentSize	<b>xsd:unsignedLong</b>	optional			documentation Indicates the content size of this file object
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Binding information between object messages					

**complexType DsiType**

children	<a href="#">DsiPrivateInformation</a> <a href="#">DsiDescriptor</a>					
used by	element <a href="#">DataCarouselType/Dsi</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	moduleId	<b>xsd:unsignedShort</b>	optional			documentation Identification of the module within the data carousel that carries the service gateway object
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	associationTag	<b>xsd:unsignedShort</b>	optional			documentation Indication the elementary stream that carries the DII message
	timeOut	<b>xsd:unsignedInt</b>	optional			documentation the time out period in microseconds that may be used to time out the acquisition of the Download Server Initiate message
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Download Server Initiate Message (A/101 10.5.3)					

**element DsiType/DsiPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			

	error	<a href="#">errorType</a>	optional
annotation	documentation These descriptors go into the DSI (A/101 10.5.3.3)		

element **DsiType/DsiDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the DSI (A/101 10.5.3.3)					

complexType **EventListType**

used by	element	<a href="#">StreamEventType/EventList</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	eventId	<b>xsd:unsignedShort</b>	required			
	eventName	<b>xsd:string</b>	required			
	eventNPT	<a href="#">eventNPTType</a>	optional			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about the name for each DSMCC stream event					

complexType **FileType**

children	<a href="#">ContentType</a> <a href="#">FilePrivateInformation</a> <a href="#">FileDescriptor</a>					
used by	element	<a href="#">ObjectCarouselType/File</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInteger</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this directory message, it is linked to pathName of the LiteOptionsProfileBody
	contentSize	<b>xsd:unsignedLong</b>	optional			documentation

	<p><b>ong</b></p> <p>field <b>xsd:string</b> optional</p> <p>action error <a href="#">actionType</a> optional</p> <p><a href="#">errorType</a> optional</p>	<p>Indicates the content size of this file object</p> <p>documentation</p> <p>Identification of the content file delivered with payload of this file message</p>
annotation	<p>documentation</p> <p>BIOP File Message (A/101 10.4.5)</p>	

**element FileType/ContentType**

type	<a href="#">ContentTypeType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	contentTypeData	<b>xsd:string</b>	optional			documentation
						Indicates the MIME content type of the object
	transparencyLabel	<a href="#">transparencyLabelType</a>	optional			documentation
						Indicates transparency level of caching
	action error	<a href="#">actionType</a>	optional			
		<a href="#">errorType</a>	optional			
annotation	documentation	Signals the format of this file				

**element FileType/FilePrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation
						Format Identifier registered by SMPTE
	action error	<a href="#">actionType</a>	optional			
		<a href="#">errorType</a>	optional			
annotation	documentation	These descriptors go into the File Message (A/101 10.4.5.2)				

**element FileType/FileDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				

attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
annotation	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
	documentation	These descriptors go into the File Message (A/101 10.4.5.2)				

**complexType HttpProfileBodyType**

used by	element	<a href="#">BindingsType/HttpProfileBody</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	hostData	<b>xsd:anyURI</b>	optional			documentation Indicates the fully qualified domain name, or the decimal shorthand(e.g "129.145.166.188")
	port	<b>xsd:unsignedShort</b>	optional	80		documentation Indicates the port at which the service side listens
	objectKey	<b>xsd:string</b>	optional			documentation Indicates the path that identifies the service side implementation
annotation	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
	documentation	Http Profile Body (A/101 10.2.3.1)				

**complexType IconType**

used by	element	<a href="#">ApplicationType/Icon</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	locator	<b>xsd:string</b>	optional			documentation Indicates the icon locator string
	iconFlags	<a href="#">iconFlagsType</a>	optional			documentation Represents the icon size
annotation	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
	documentation	Application Icons Descriptor (ETSI TS 101 812 V1.3.1 10.7.4.2)				

**complexType LabelsType**

used by	element	<a href="#">PrefetchType/Labels</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	label	<b>xsd:string</b>	required			documentation Identifies the module label
annotation	priority	<a href="#">priorityType</a>	required			documentation Describes the prefetching priority (1-100)
	documentation					

annotation	documentation Information about the labels loop of the prefetch descriptor
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**complexType LabelType**

used by	elements	<a href="#">ModuleType/Label</a> <a href="#">BindingsType/Label</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	label	<b>xsd:string</b>	optional			documentation Indicates current module label
annotation	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
	documentation Label Descriptor (ETSI TS 101 812 V1.3.1 B.2.2.4.1)					

**complexType LiteOptionsProfileBodyType**

used by	element	<a href="#">BindingsType/LiteOptionsProfileBody</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	carouselId	<b>xsd:unsignedInt</b>	optional			documentation Identification of the data carousel
	sourceId	<b>xsd:unsignedShort</b>	optional			documentation PSIP source_id (A/65B 6.3)
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this binding message
annotation	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
	documentation Lite Options Profile Body (ETSI TS 101 812 V1.3.1 B.2.3.7.2)					

**complexType ModuleType**

children	<a href="#">ObjectList</a> <a href="#">CompressedModule</a> <a href="#">Label</a> <a href="#">CachingPriority</a> <a href="#">DiiPrivateInformation</a> <a href="#">DiiDescriptor</a>					
used by	element	<a href="#">DiiType/Module</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	moduleId	<b>xsd:unsignedShort</b>	required			documentation Identifier of the module in the carousel
	moduleSize	<b>xsd:unsignedInt</b>	optional			documentation Indicates the length in bytes of the current module
	moduleTimeOut	<b>xsd:unsignedInt</b>	optional			documentation Indicates the time out value in microseconds that may be used to time out the acquisition of all blocks of the module
annotation	blockTimeOut	<b>xsd:unsignedInt</b>	optional			documentation

	<p style="text-align: center;"><b>t</b></p> <p>minBlockTime    <b>xsd:unsignedInt</b>    optional</p> <p>associationTag    <b>xsd:unsignedShort</b>    optional</p> <p>action error    <a href="#">actionType</a>    optional</p> <p>                  <a href="#">errorType</a>    optional</p>	<p>Indicates the time out value in microseconds that may be used to time out the reception of the next block of the after a block has been acquired</p> <p>documentation Indicates the minimum time period that exists between the delivery of two subsequent blocks of the described module</p> <p>documentation Indication the elementary stream that carries the DDB message</p>
annotation	documentation Module that is referenced in the DII message	

**element ModuleType/ObjectList**

type	<a href="#">ObjectListType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectKey	<b>xsd:unsignedInt</b>	required			documentation Identification of the object within the module
	objectId	<b>xsd:unsignedLong</b>	optional			documentation Identification of the object in an object carousel
	action error	<a href="#">actionType</a>	optional			
		<a href="#">errorType</a>	optional			
annotation	documentation List of the object within the module					

**element ModuleType/CompressedModule**

type	<a href="#">CompressedModuleType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	compressionMet	<b>xsd:unsignedByte</b>	optional			documentation

	<p>hod <b>yte</b></p> <p>originalSize <b>xsd:unsignedInt</b> optional</p> <p>action error <a href="#">actionType</a> optional</p> <p>error <a href="#">errorType</a> optional</p>	<p>compression algorithm defined in IETF RFC 1950 documentation the size of the data (in bytes) carried by the module before it was compressed</p>
annotation	<p>documentation Information about the data in the module has the 'zlib' structure as defined in IETF RFC 1950 (A/101 10.5.2.3.1)</p>	

**element ModuleType/Label**

type	<a href="#">LabelType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	label	<b>xsd:string</b>	optional			documentation Indicates current module label
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	<p>documentation Information about the label to the corresponding module (A/101 10.5.2.3.2)</p>					

**element ModuleType/CachingPriority**

type	<a href="#">CachingPriorityType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	priorityValue	<b>xsd:unsignedByte</b>	optional			documentation Indicates the caching priority for the objects within this module
	transparencyLabel	<a href="#">transparencyLabelType</a>	optional			documentation Indicates transparency level of caching
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	<p>documentation Information about the priority value for the caching (A/101 10.5.2.3.3)</p>					

**element ModuleType/DiiPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				

	content	complex									
facets	maxLength	251									
attributes	Name	formatIdentifier	Type	xsd:unsignedInt	Use	required	Default	Fixed	Annotation	documentation	Format Identifier registered by SMPTE
	action	error		<a href="#">actionType</a> <a href="#">errorType</a>	optional	optional					
annotation	documentation These descriptors go into the DII (A/101 10.5.2.3)										

### element **ModuleType/DiiDescriptor**

type	<a href="#">DescriptorType</a>										
properties	isRef	0									
	minOcc	0									
	maxOcc	unbounded									
	content	complex									
attributes	Name	descriptorTag	Type	xsd:unsignedByte	Use	required	Default	Fixed	Annotation	documentation	Descriptor tag
	action	error		<a href="#">actionType</a> <a href="#">errorType</a>	optional	optional					
annotation	documentation These descriptors go into the DII (A/101 10.5.2.3)										

### complexType **ObjectCarouselType**

children	<a href="#">ServiceGateway</a> <a href="#">Directory</a> <a href="#">File</a> <a href="#">Stream</a> <a href="#">StreamEvent</a>										
used by	element	<a href="#">AcapObjectCarouselType/ObjectCarousel</a>									
attributes	Name	action	Type	<a href="#">actionType</a>	Use	optional	Default	Fixed	Annotation		
	error			<a href="#">errorType</a>	optional	optional					
annotation	documentation Information about BIOP messages of Object Carousel										

### element **ObjectCarouselType/ServiceGateway**

type	<a href="#">ServiceGatewayType</a>										
properties	isRef	0									
	minOcc	0									
	maxOcc	1									
	content	complex									
children	<a href="#">Bindings</a>										
attributes	Name	objectId	Type	xsd:unsignedLong	Use	optional	Default	Fixed	Annotation	documentation	Identification of the object in an object carousel
	objectKey			xsd:unsignedInt	optional				documentation	Identification of the object within the module	
	action	error		<a href="#">actionType</a> <a href="#">errorType</a>	optional	optional					
annotation	documentation Defines the Service Gateway Object Message of Object Carousel										



element **ObjectCarouselType/Directory**

type	<a href="#">DirectoryType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Bindings</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this directory message, it is linked to pathName of the LiteOptionsProfileBody
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Defines the Directory Object Message of the Object Carousel					

element **ObjectCarouselType/File**

type	<a href="#">FileType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">ContentType</a> <a href="#">FilePrivateInformation</a> <a href="#">FileDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message

	<p>pathName      <b>xsd:string</b>      optional</p> <p>contentSize    <b>xsd:unsignedLong</b>      optional</p> <p>fileId          <b>xsd:string</b>          optional</p> <p>action error    <a href="#">actionType</a>      optional</p> <p>                  <a href="#">errorType</a>      optional</p>	<p>documentation Indicates the path name of this directory message, it is linked to pathName of the LiteOptionsProfileBody</p> <p>documentation Indicates the content size of this file object</p> <p>documentation Identification of the content file delivered with payload of this file message</p>
annotation	documentation Defines the File Object Message of the Object Carousel	

element **ObjectCarouselType/Stream**

type	<a href="#">StreamType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Tap</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this directory message, it is linked to pathName of the LiteOptionsProfileBody
	durationSeconds	<b>xsd:unsignedInt</b>	optional			documentation Defines the duration in seconds
durationMicroseconds	<b>xsd:unsignedInt</b>	optional			documentation Defines the duration in microseconds	

	audio	<b>xsd:boolean</b>	optional	documentation Indicates whether this stream contains audio stream or not
	video	<b>xsd:boolean</b>	optional	documentation Indicates whether this object contains video stream or not
	data	<b>xsd:boolean</b>	optional	documentation Indicates whether this object contains data stream or not
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional	
annotation	documentation Defines the Stream Object Message of the Object Carousel			

element **ObjectCarouselType/StreamEvent**

type	<a href="#">StreamEventType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Tap EventList</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this directory message, it is linked to pathName of the LiteOptionsProfileBody
	durationSeconds	<b>xsd:unsignedInt</b>	optional			documentation Defines the duration in seconds
	durationMicroseconds	<b>xsd:unsignedInt</b>	optional			documentation Define the duration in microseconds
	audio	<b>xsd:boolean</b>	optional			documentation Indicates

	video	<b>xsd:boolean</b>	optional			whether this stream contains audio stream or not documentation Indicates whether this object contains video stream or not
	data	<b>xsd:boolean</b>	optional			documentation Indicates whether this object contains data stream or not
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Defines the Stream Event Object Message of the Object Carousel					

complexType **ObjectListType**

used by	element <a href="#">ModuleType/ObjectList</a>					
attributes	Name objectKey	Type <b>xsd:unsignedInt</b>	Use required	Default	Fixed	Annotation documentation Identification of the object within the module
	objectId	<b>xsd:unsignedLong</b>	optional			documentation Identification of the object in an object carousel
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation List of the object key					

complexType **PidListType**

used by	element <a href="#">DataCarouselType/PidList</a>					
attributes	Name associationTag	Type <b>xsd:unsignedShort</b>	Use required	Default	Fixed	Annotation documentation Identifies the PID that carries the elementary stream
	pid	<a href="#">pidType</a>	optional			documentation PID used to carry the data carousel
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation List of PIDs that carries the data carousel					

complexType **PrefetchType**

children	<a href="#">Labels</a>					
used by	element <a href="#">ApplicationType/Prefetch</a>					

attributes	Name protocollabel	Type <b>xsd:unsignedByte</b>	Use optional	Default	Fixed	Annotation documentation Identifies the transport protocol descriptor that specifies the object carousel that delivers the modules to which this prefetch descriptor refers
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Pre-fetch Descriptor (ETSI TS 101 812 V1.3.1 10.8.3.2)					

### element PrefetchType/Labels

type	<a href="#">LabelsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name label	Type <b>xsd:string</b>	Use required	Default	Fixed	Annotation documentation Identifies the module label
	priority	<a href="#">priorityType</a>	required			documentation Describes the prefetching priority (1-100)
annotation	documentation Loop of the pre-fetch descriptor					

### complexType ProfilesType

used by	element <a href="#">ApplicationInfoType/Profiles</a>					
attributes	Name profile	Type <b>xsd:unsignedShort</b>	Use required	Default	Fixed	Annotation documentation Represent the application type specific profile
	versionMajor	<b>xsd:unsignedByte</b>	optional			documentation Indicates the major sub-field of the profile version number
	versionMinor	<b>xsd:unsignedByte</b>	optional			documentation Indicates the minor sub-field of the profile version number
	versionMicro	<b>xsd:unsignedByte</b>	optional			documentation Indicates the micro sub-field of the profile version number
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			

annotation	documentation Information about the application profile loop of the application descriptor
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**complexType ProtocolLabelsType**

used by	element <a href="#">ApplicationInfoType/ProtocolLabels</a>					
attributes	Name protocollabel	Type <b>xsd:unsignedByte</b>	Use required	Default	Fixed	Annotation documentation Identifies the transport protocol that delivers the application
annotation	documentation Information about the transport protocol labels loop of the application descriptor					

**complexType ServiceGatewayType**

children	<a href="#">Bindings</a>					
used by	element <a href="#">ObjectCarouselType/ServiceGateway</a>					
attributes	Name objectId	Type <b>xsd:unsignedLong</b>	Use optional	Default	Fixed	Annotation documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation BIOP ServiceGateway Message (A/101 10.4.2)					

**element ServiceGatewayType/Bindings**

type	<a href="#">BindingsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">BiopProfileBody</a> <a href="#">LiteOptionsProfileBody</a> <a href="#">HttpProfileBody</a> <a href="#">Label</a> <a href="#">MessagePrivateInformation</a> <a href="#">MessageDescriptor</a>					
attributes	Name objectId	Type <b>xsd:unsignedLong</b>	Use required	Default	Fixed	Annotation documentation Identification of the object in an object carousel
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this binding message
	kind	<b>xsd:string</b>	optional			documentation Indicates the kind of this binding message
	contentSize	<b>xsd:unsignedLong</b>	optional			documentation Indicates the content size of

	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	this file object
annotation	documentation Binding information between object messages	

complexType **StreamEventType**

children	<a href="#">Tap EventList</a>					
used by	element <a href="#">ObjectCarouselType/StreamEvent</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of this directory message, it is linked to pathName of the LiteOptionsProfileBody
	durationSeconds	<b>xsd:unsignedInt</b>	optional			documentation Defines the duration in seconds
	durationMicroseconds	<b>xsd:unsignedInt</b>	optional			documentation Define the duration in microseconds
	audio	<b>xsd:boolean</b>	optional			documentation Indicates whether this stream contains audio stream or not
	video	<b>xsd:boolean</b>	optional			documentation Indicates whether this object contains video stream or not
	data	<b>xsd:boolean</b>	optional			documentation Indicates whether this object contains data stream or not
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation BIOP Stream Event Message (A/101 10.4.7)					

element **StreamEventType/Tap**

type	<a href="#">TapType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	associationTag	<b>xsd:unsignedShort</b>	required			documentation Identifies the PID that carries the elementary stream
	id	<b>xsd:unsignedShort</b>	optional			
	use	<a href="#">useType</a>	optional			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about the streams that are associated with this stream object					

element **StreamEventType/EventList**

type	<a href="#">EventListType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	eventId	<b>xsd:unsignedShort</b>	required			
	eventName	<b>xsd:string</b>	required			
	eventNPT	<a href="#">eventNPTType</a>	optional			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about the name for each DSMCC stream event					

complexType **StreamType**

children	<a href="#">Tap</a>					
used by	element	<a href="#">ObjectCarouselType/Stream</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	objectId	<b>xsd:unsignedLong</b>	required			documentation Identification of the object in an object carousel
	objectKey	<b>xsd:unsignedInteger</b>	optional			documentation Identification of the object within the module
	name	<b>xsd:string</b>	optional			documentation Indicates the name of this directory message
	pathName	<b>xsd:string</b>	optional			documentation Indicates the path name of



	<p>durationSeconds    <b>xsd:unsignedInt</b>    optional</p> <p>durationMicroSeconds    <b>xsd:unsignedInt</b>    optional</p> <p>audio    <b>xsd:boolean</b>    optional</p> <p>video    <b>xsd:boolean</b>    optional</p> <p>data    <b>xsd:boolean</b>    optional</p> <p>action error    <a href="#">actionType</a>    optional     <a href="#">errorType</a>    optional</p>	<p>this directory message, it is linked to pathName of the LiteOptionsProfileBody documentation Defines the duration in seconds documentation Defines the duration in microseconds documentation Indicates whether this stream contains audio stream or not documentation Indicates whether this object contains video stream or not documentation Indicates whether this object contains data stream or not</p>
annotation	documentation BIOP Stream Message (A/101 10.4.6)	

element **StreamType/Tap**

type	<a href="#">TapType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	associationTag	<b>xsd:unsignedShort</b>	required			documentation Identifies the PID that carries the elementary stream
	id	<b>xsd:unsignedShort</b>	optional			
	use	<a href="#">useType</a>	optional			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Information about the streams that are associated with this stream object					

complexType **TapType**

used by	elements	<a href="#">StreamType/Tap</a> <a href="#">StreamEventType/Tap</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	associationTag	<b>xsd:unsignedShort</b>	required			documentation Identifies the

	<p>id                    <b>xsd:unsignedShort</b>    optional</p> <p>useActionType    <a href="#">useType</a>            optional</p> <p>errorType        <a href="#">actionType</a>        optional</p> <p>                    <a href="#">errorType</a>        optional</p>	PID that carries the elementary stream
annotation	documentation Facilitates a reference to a particular network connection by means of an association tag or a component tag	

**complexType TransportProtocolType**

used by	element <a href="#">AcapApplicationType/TransportProtocol</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	protocollabel	<b>xsd:unsignedByte</b>	required			documentation unique identifier for a transport protocol within this AIT
	remoteConnection	<b>xsd:boolean</b>	optional			documentation indicates that the transport connection is provided by a service that is different to the one carrying the AIT
	sourceId	<b>xsd:unsignedShort</b>	optional			documentation SourceId resolves to a virtual channel
	componentTag	<b>xsd:unsignedByte</b>	optional			documentation Indication the elementary stream that carries the DSI of the object carousel
	useActionType	<a href="#">actionType</a>	optional			
	errorType	<a href="#">errorType</a>	optional			
annotation	documentation Transport Protocol Descriptor (ETSI TS 101 812 V1.3.1 10.8.1)					

**simpleType controlCodeType**

type	restriction of <b>xsd:string</b>	
used by	attribute <a href="#">ApplicationType/@controlCode</a>	
facets	enumeration	AUTOSTART
	enumeration	PRESENT
	enumeration	DESTROY
	enumeration	KILL
	enumeration	PREFETCH
	enumeration	REMOTE
annotation	documentation controls the state of the application	

**simpleType eventNPTType**

type	restriction of <b>xsd:unsignedLong</b>
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used by	attribute <a href="#">EventListType/@eventNPT</a>
facets	maxInclusive 8589934592
annotation	documentation The value of the NPT when the event occurred, or the value of the NPT when the event will occur

**simpleType iconFlagsType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">IconType/@iconFlags</a>
facets	enumeration 32x32_square enumeration 32x32_broadcast_4:3 enumeration 24x32_broadcast_16:9 enumeration 64x64_square enumeration 64x64_broadcast_4:3 enumeration 48x64_broadcast_16:9 enumeration 128x128_square enumeration 128x128_broadcast_4:3 enumeration 96x128_broadcast_16:9
annotation	documentation identifies the icons that are provided for the application

**simpleType identificationType**

type	restriction of <b>xsd:unsignedShort</b>
used by	attributes <a href="#">DiiListType/@identification</a> <a href="#">DiiType/@Identification</a> <a href="#">BiopProfileBodyType/@identification</a>
facets	maxExclusive 32768
annotation	documentation The identification portion of the transactionId

**simpleType priorityType**

type	restriction of <b>xsd:unsignedByte</b>
used by	attribute <a href="#">LabelsType/@priority</a>
facets	minInclusive 1 maxInclusive 100
annotation	documentation expresses a prefetching hint of the modules with the corresponding label using the specified priority

**simpleType transparencyLabelType**

type	restriction of <b>xsd:string</b>
used by	attributes <a href="#">CachingPriorityType/@transparencyLabel</a> <a href="#">ContentTypeType/@transparencyLabel</a>
facets	enumeration Transparent enumeration Semi-transparent enumeration Static
annotation	documentation identifies the transparency level of the caching

**simpleType useType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">TapType/@use</a>
facets	enumeration STR_NPT_USE enumeration BIOP_PROGRAM_USE

annotation	documentation Usage of the Tap
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**simpleType visibilityType**

type	restriction of <b>xsd:unsignedByte</b>
used by	attribute <a href="#">ApplicationInfoType/@visibility</a>
facets	maxExclusive 4
annotation	documentation specifies whether the application is suitable to be offered to the end-user for them to decide if the application should be launched

**complexType ConditionalAccessType**

type	extension of <b>xsd:hexBinary</b>					
properties	base <b>xsd:hexBinary</b>					
used by	elements <a href="#">TransportStreamType/ConditionalAccess</a> <a href="#">ChannelType/ConditionalAccess</a> <a href="#">ElementaryStreamType/ConditionalAccess</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	systemId	<b>xsd:unsignedShort</b>	required			documentation Conditional access system ID
	pid	<a href="#">pidType</a>	optional			documentation EMM or ECM PID, depending on context
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation MPEG-2 conditional_access_descriptor. Declares an EMM PID at the transport stream level and an ECM PID at the program or elementary stream level.					

**complexType DescriptorType**

type	extension of <b>xsd:hexBinary</b>					
properties	base <b>xsd:hexBinary</b>					
used by	elements <a href="#">AcapApplicationType/AitDescriptor</a> <a href="#">ApplicationType/AitDescriptor</a> <a href="#">RegionType/Descriptor</a> <a href="#">PspipDataEventType/DetDescriptor</a> <a href="#">ModuleType/DiiDescriptor</a> <a href="#">DsiType/DsiDescriptor</a> <a href="#">PspipEventType/EitDescriptor</a> <a href="#">FileType/FileDescriptor</a> <a href="#">BindingsType/MessageDescriptor</a> <a href="#">TableType/MgtDescriptor</a> <a href="#">TransportStreamType/MgtDescriptor</a> <a href="#">ChannelType/PmtDescriptor</a> <a href="#">ElementaryStreamType/PmtDescriptor</a> <a href="#">TimeParametersType/SttDescriptor</a> <a href="#">TransportStreamType/VctDescriptor</a> <a href="#">ChannelType/VctDescriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Generic descriptor type, used for future extensions of the PSIP standard. All currently defined PSIP descriptors have their own associated type.					

**complexType PrivateInformationType**

type	extension of <a href="#">privateInformationDataType</a>
properties	base <b>privateInformationDataType</b>

used by	elements	<a href="#">AcapApplicationType/AitPrivateInformation</a> <a href="#">ApplicationType/AitPrivateInformation</a> <a href="#">PsipDataEventType/DetPrivateInformation</a> <a href="#">ModuleType/DiiPrivateInformation</a> <a href="#">DsiType/DsiPrivateInformation</a> <a href="#">PsipEventType/EitPrivateInformation</a> <a href="#">FileType/FilePrivateInformation</a> <a href="#">BindingsType/MessagePrivateInformation</a> <a href="#">TableType/MgtPrivateInformation</a> <a href="#">TransportStreamType/MgtPrivateInformation</a> <a href="#">ChannelType/PmtPrivateInformation</a> <a href="#">ElementaryStreamType/PmtPrivateInformation</a> <a href="#">RegionType/PrivateInformation</a> <a href="#">TimeParametersType/SttPrivateInformation</a> <a href="#">TransportStreamType/VctPrivateInformation</a> <a href="#">ChannelType/VctPrivateInformation</a>				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<a href="#">xsd:unsignedInt</a>	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation	ATSC Private Information descriptor, used for sending private data in an ATSC table (A/53B Amendment 2, 5.7.3.4)				

**complexType PrivatePmcpInformationType**

used by	elements	<a href="#">PmcpMessage/PrivatePmcpInformation</a> <a href="#">TransportStreamType/PrivatePmcpInformation</a> <a href="#">ChannelType/PrivatePmcpInformation</a> <a href="#">PsipEventType/PrivatePmcpInformation</a> <a href="#">PsipDataEventType/PrivatePmcpInformation</a> <a href="#">AcapDataServiceType/PrivatePmcpInformation</a> <a href="#">ShowType/PrivatePmcpInformation</a>				
annotation	documentation	Any sequence of well-formed private xml elements. Allows systems to carry additional private information in a PMCP message				

**complexType RedistributionControlType**

children	<a href="#">Null</a>					
used by	elements	<a href="#">ChannelType/RedistributionControl</a> <a href="#">ShowDataType/RedistributionControl</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation	Redistribution Control Descriptor (A/65B 6.9.13)				

**element RedistributionControlType/Null**

properties	isRef	0	
	minOcc	0	
	maxOcc	1	
	content	complex	
annotation	documentation	Means that there is no redistribution control descriptor	

**complexType TextType**

type	extension of <a href="#">xsd:string</a>					
properties	base	<a href="#">xsd:string</a>				
used by	elements	<a href="#">RatingValueType/AbbrevName</a> <a href="#">ChannelType/Description</a> <a href="#">PsipDataEventType/Description</a> <a href="#">ShowDataType/Description</a> <a href="#">DataBroadcastType/Description</a> <a href="#">TransportStreamType/Name</a> <a href="#">ChannelType/Name</a> <a href="#">PsipDataEventType/Name</a> <a href="#">ApplicationType/Name</a> <a href="#">ElementaryStreamType/Name</a> <a href="#">DimensionType/Name</a> <a href="#">RatingValueType/Name</a> <a href="#">RegionType/Name</a> <a href="#">ShowDataType/Name</a> <a href="#">DataBroadcastType/ObjectName</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			

	error	<a href="#">errorType</a>	optional
annotation	documentation Multiple string structure of PSIP (A/65B 6.10)		

simpleType **actionType**

type	restriction of <b>xsd:string</b>		
used by	attributes	<a href="#">StreamIdentifierType/@action</a> <a href="#">DataBroadcastIdType/@action</a> <a href="#">ApplicationSignalingType/@action</a> <a href="#">CarouselIdentifierType/@action</a> <a href="#">ElementaryStreamType/@action</a> <a href="#">RedistributionControlType/@action</a> <a href="#">ConditionalAccessType/@action</a> <a href="#">TextType/@action</a> <a href="#">DescriptorType/@action</a> <a href="#">PrivateInformationType/@action</a> <a href="#">EventListType/@action</a> <a href="#">TapType/@action</a> <a href="#">HttpProfileBodyType/@action</a> <a href="#">LiteOptionsProfileBodyType/@action</a> <a href="#">BiopProfileBodyType/@action</a> <a href="#">BindingsType/@action</a> <a href="#">ContentTypeType/@action</a> <a href="#">CachingPriorityType/@action</a> <a href="#">LabelType/@action</a> <a href="#">CompressedModuleType/@action</a> <a href="#">IsanType/@action</a> <a href="#">DataBroadcastType/@action</a> <a href="#">AlternateIdType/@action</a> <a href="#">HouseNumberType/@action</a> <a href="#">ContentIdType/@action</a> <a href="#">ShowDataType/@action</a> <a href="#">ShowType/@action</a> <a href="#">CaptionsType/@action</a> <a href="#">Caption708Type/@action</a> <a href="#">Caption608Type/@action</a> <a href="#">ParentalRatingType/@action</a> <a href="#">RatingType/@action</a> <a href="#">RegionType/@action</a> <a href="#">RatingsType/@action</a> <a href="#">RatingValueType/@action</a> <a href="#">DimensionType/@action</a> <a href="#">Ac3AudioType/@action</a> <a href="#">AudiosType/@action</a> <a href="#">AssociationTagsType/@action</a> <a href="#">AssociationTagType/@action</a> <a href="#">ApplicationInfoType/@action</a> <a href="#">DiiLocationType/@action</a> <a href="#">TransportProtocolType/@action</a> <a href="#">ApplicationType/@action</a> <a href="#">AcapApplicationType/@action</a> <a href="#">AcapDataServiceType/@action</a> <a href="#">TimeParametersType/@action</a> <a href="#">PspDataEventType/@action</a> <a href="#">DataIdType/@action</a> <a href="#">PspEventType/@action</a> <a href="#">EventIdType/@action</a> <a href="#">PspDataIdType/@action</a> <a href="#">PspEventIdType/@action</a> <a href="#">InitialScheduleType/@action</a> <a href="#">PmcpEventIdType/@action</a> <a href="#">DeferredAssociationTagsType/@action</a> <a href="#">ChannelType/@action</a> <a href="#">TimeShiftedServiceType/@action</a> <a href="#">TransportStreamType/@action</a> <a href="#">TableType/@action</a> <a href="#">ObjectListType/@action</a> <a href="#">ModuleType/@action</a> <a href="#">StreamEventType/@action</a> <a href="#">StreamType/@action</a> <a href="#">FileType/@action</a> <a href="#">DirectoryType/@action</a> <a href="#">ServiceGatewayType/@action</a> <a href="#">PidListType/@action</a> <a href="#">DiiType/@action</a> <a href="#">DsiType/@action</a> <a href="#">ObjectCarouselType/@action</a> <a href="#">DataCarouselType/@action</a> <a href="#">AcapObjectCarouselType/@action</a> <a href="#">ProfilesType/@action</a> <a href="#">AcapXAppBoundaryType/@action</a> <a href="#">AcapXAppLocationType/@action</a> <a href="#">AcapXAppType/@action</a> <a href="#">AcapJAppLocationType/@action</a> <a href="#">AcapJAppType/@action</a> <a href="#">PrefetchType/@action</a> <a href="#">IconType/@action</a>	
facets	enumeration	read	
	enumeration	add	
	enumeration	update	
	enumeration	remove	
annotation	documentation Enables the sender of a message to indicate, for each element, which action should be performed on the current element. The rules governing the allowed values can be found in the PMCP Standard.		

simpleType **applicationType**

type	restriction of <b>xsd:string</b>		
used by	attributes	<a href="#">AcapApplicationType/@applicationType</a> <a href="#">ApplicationSignalingType/@applicationType</a> <a href="#">ApplicationTypesType/@applicationType</a>	
facets	enumeration	ACAP-J	
	enumeration	DVB-J	
	enumeration	ACAP-X	
annotation	documentation Type of the application described in this AIT sub_table (A/101 10.6.2.3)		

simpleType **audioldType**

type	restriction of <b>xsd:unsignedByte</b>		
used by	attributes	<a href="#">ElementaryStreamType/@audiold</a> <a href="#">Ac3AudioType/@audiold</a>	
facets	minInclusive	1	
annotation	documentation Type for an audiold attribute		

simpleType **channelNumberType**

type	union of ( <a href="#">onePartType</a> , <a href="#">twoPartType</a> )
used by	attributes <a href="#">ChannelCopyType/@channel</a> <a href="#">ChannelType/@channelNumber</a> <a href="#">EventIdType/@channelNumber</a> <a href="#">DataIdType/@channelNumber</a>
annotation	documentation Specifies the format of a two-part or one-part channel number

simpleType **elementaryErrorType**

type	restriction of <code>xsd:string</code>
used by	simpleType <a href="#">errorType</a>
facets	pattern (element_does_not_exist *_out_of_range *_missing *_change_denied)(:.*)?
annotation	documentation Type for an elementary error

simpleType **errorType**

type	list of <a href="#">elementaryErrorType</a>
used by	attributes <a href="#">DataBroadcastIdType/@error</a> <a href="#">ApplicationSignalingType/@error</a> <a href="#">CarouselIdentifierType/@error</a> <a href="#">ElementaryStreamType/@error</a> <a href="#">RedistributionControlType/@error</a> <a href="#">ConditionalAccessType/@error</a> <a href="#">TextType/@error</a> <a href="#">DescriptorType/@error</a> <a href="#">PrivateInformationType/@error</a> <a href="#">EventListType/@error</a> <a href="#">TapType/@error</a> <a href="#">HttpProfileBodyType/@error</a> <a href="#">LiteOptionsProfileBodyType/@error</a> <a href="#">BiopProfileBodyType/@error</a> <a href="#">BindingsType/@error</a> <a href="#">ContentTypeType/@error</a> <a href="#">CachingPriorityType/@error</a> <a href="#">LabelType/@error</a> <a href="#">CompressedModuleType/@error</a> <a href="#">ObjectListType/@error</a> <a href="#">IsanType/@error</a> <a href="#">DataBroadcastType/@error</a> <a href="#">AlternateIdType/@error</a> <a href="#">HouseNumberType/@error</a> <a href="#">ContentIdType/@error</a> <a href="#">ShowDataType/@error</a> <a href="#">ShowType/@error</a> <a href="#">CaptionsType/@error</a> <a href="#">Caption708Type/@error</a> <a href="#">Caption608Type/@error</a> <a href="#">ParentalRatingType/@error</a> <a href="#">RatingType/@error</a> <a href="#">RegionType/@error</a> <a href="#">RatingsType/@error</a> <a href="#">RatingValueType/@error</a> <a href="#">DimensionType/@error</a> <a href="#">Ac3AudioType/@error</a> <a href="#">AudiosType/@error</a> <a href="#">AssociationTagsType/@error</a> <a href="#">AssociationTagType/@error</a> <a href="#">StreamIdentifierType/@error</a> <a href="#">DiiLocationType/@error</a> <a href="#">TransportProtocolType/@error</a> <a href="#">ApplicationType/@error</a> <a href="#">AcapApplicationType/@error</a> <a href="#">AcapDataServiceType/@error</a> <a href="#">TimeParametersType/@error</a> <a href="#">PspDataEventType/@error</a> <a href="#">DataIdType/@error</a> <a href="#">PspEventType/@error</a> <a href="#">EventIdType/@error</a> <a href="#">PspDataIdType/@error</a> <a href="#">PspEventIdType/@error</a> <a href="#">InitialScheduleType/@error</a> <a href="#">PmcpEventIdType/@error</a> <a href="#">DeferredAssociationTagsType/@error</a> <a href="#">ChannelType/@error</a> <a href="#">TimeShiftedServiceType/@error</a> <a href="#">TransportStreamType/@error</a> <a href="#">TableType/@error</a> <a href="#">PmcpMessage/@error</a> <a href="#">ModuleType/@error</a> <a href="#">StreamEventType/@error</a> <a href="#">StreamType/@error</a> <a href="#">FileType/@error</a> <a href="#">DirectoryType/@error</a> <a href="#">ServiceGatewayType/@error</a> <a href="#">PidListType/@error</a> <a href="#">DiiType/@error</a> <a href="#">DsiType/@error</a> <a href="#">ObjectCarouselType/@error</a> <a href="#">DataCarouselType/@error</a> <a href="#">AcapObjectCarouselType/@error</a> <a href="#">ProfilesType/@error</a> <a href="#">AcapXAppBoundaryType/@error</a> <a href="#">AcapXAppLocationType/@error</a> <a href="#">AcapXAppType/@error</a> <a href="#">AcapJAppLocationType/@error</a> <a href="#">AcapJAppType/@error</a> <a href="#">PrefetchType/@error</a> <a href="#">IconType/@error</a> <a href="#">ApplicationInfoType/@error</a>
annotation	documentation Used in a message of type "reply" with a status of "error" to indicate where and why an error occurred

simpleType **languageType**

type	restriction of <code>xsd:string</code>
used by	attributes <a href="#">TextType/@lang</a> <a href="#">Ac3AudioType/@lang</a> <a href="#">Caption708Type/@lang</a>
facets	pattern [a-z]{3}
annotation	documentation Three-letter language code per ISO-639-2

**simpleType onePartType**

type	restriction of <b>xsd:unsignedShort</b>
used by	simpleType <a href="#">channelNumberType</a>
facets	maxExclusive 16384
annotation	documentation Type for one-part channel number for cable

**simpleType pidType**

type	restriction of <b>xsd:unsignedShort</b>
used by	attributes <a href="#">ChannelType/@pcrPid</a> <a href="#">PidListType/@pid</a> <a href="#">ConditionalAccessType/@pid</a> <a href="#">ElementaryStreamType/@pid</a> <a href="#">ChannelType/@pmtPid</a> <a href="#">TableType/@tablePid</a>
facets	maxExclusive 8192
annotation	documentation Specifies the format of an MPEG-2 PID.

**simpleType privateInformationDataType**

type	restriction of <b>xsd:hexBinary</b>
used by	complexType <a href="#">PrivateInformationType</a>
facets	maxLength 251
annotation	documentation Specifies the format of private data to be carried in ATSC tables

**simpleType statusType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">PmcpReplyType/@status</a>
facets	enumeration valid enumeration invalid enumeration OK enumeration error
annotation	documentation Status of a reply message

**simpleType twoPartType**

type	restriction of <b>xsd:string</b>
used by	simpleType <a href="#">channelNumberType</a>
facets	pattern [1-9][0-9]{0,2}-[0-9]{1,3}
annotation	documentation Type for two-part channel number (Major-Minor)

**complexType ApplicationSignalingType**

used by	element <a href="#">ElementaryStreamType/ApplicationSignaling</a>												
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>applicationType</td> <td><a href="#">applicationType</a> <a href="#">eType</a></td> <td>optional</td> <td></td> <td></td> <td>documentation the application type of an</td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	applicationType	<a href="#">applicationType</a> <a href="#">eType</a>	optional			documentation the application type of an
Name	Type	Use	Default	Fixed	Annotation								
applicationType	<a href="#">applicationType</a> <a href="#">eType</a>	optional			documentation the application type of an								



						Application Information Table sub-table that is on this elementary stream
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Application Signalling Descriptor (A/101 10.6.2.3)					

**complexType ApplicationTypesType**

used by	element <a href="#">DataBroadcastIdType/ApplicationTypes</a>					
attributes	Name applicationType	Type <a href="#">applicationType</a>	Use required	Default	Fixed	Annotation documentation Indicate the type of the application
annotation	documentation List of the application type					

**complexType AssociationTagsType**

used by	element <a href="#">DeferredAssociationTagsType/AssociationTags</a>					
attributes	Name associationTag	Type <b>xsd:unsignedShort</b>	Use required	Default	Fixed	Annotation documentation Identifies the connection on which the DII message is broadcast
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation List of the association tag					

**complexType AssociationTagType**

used by	element <a href="#">ElementaryStreamType/AssociationTag</a>					
attributes	Name associationTag	Type <b>xsd:unsignedShort</b>	Use optional	Default	Fixed	Annotation documentation Identifies the connection on which the DII message is broadcast
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Association Tag Descriptor (ISO/IEC 13818-6 11.5.2)					

**complexType CarouselIdentifierType**

used by	element <a href="#">ElementaryStreamType/CarouselIdentifier</a>					
attributes	Name carouselId	Type <b>xsd:unsignedInt</b>	Use optional	Default	Fixed	Annotation documentation Identification of the data carousel
	formatId	<a href="#">formatIdType</a>	optional			documentation identify

	<p>moduleId <b>xsd:unsignedShort</b> optional</p> <p>blockSize <b>xsd:unsignedShort</b> optional</p> <p>moduleSize <b>xsd:unsignedInt</b> optional</p> <p>compressionMethod <b>xsd:unsignedByte</b> optional</p> <p>originalSize <b>xsd:unsignedInt</b> optional</p> <p>timeOut <b>xsd:unsignedByte</b> optional</p> <p>objectKey <b>xsd:unsignedInt</b> optional</p> <p>action error <a href="#">actionType</a> optional <a href="#">errorType</a> optional</p>	<p>whether the carousel supports the enhanced boot mechanism or not</p> <p>documentation Identifier of the module in the carousel</p> <p>documentation the size in bytes of every block in the module</p> <p>documentation the size of the module in bytes</p> <p>documentation compression algorithm defined in IETF RFC 1950</p> <p>documentation the size of the data (in bytes) carried by the module before it was compressed</p> <p>documentation timeout in seconds for acquisition of all blocks of the module</p> <p>documentation Identify the BIOP message that is the ServiceGateway message</p>
annotation	documentation Carousel Identifier Descriptor (A/101 10.6.2.2)	

complexType **DataBroadcastIdType**

children	<a href="#">ApplicationTypes</a>					
used by	element	<a href="#">ElementaryStreamType/DataBroadcastId</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Data Broadcast Id Descriptor (A/101 10.6.2.4)					

element **DataBroadcastIdType/ApplicationTypes**

type	<a href="#">ApplicationTypesType</a>		
properties	isRef	0	
	minOcc	0	
	maxOcc	unbounded	

	content	complex					
attributes	Name applicationType	Type <a href="#">applicationType</a> <a href="#">eType</a>	Use required	Default	Fixed	Annotation documentation Indicate the type of the application	
annotation	documentation Describes the Information about application types contained in the descriptor						

### complexType ElementaryStreamType

children	<a href="#">Name</a> <a href="#">ConditionalAccess</a> <a href="#">CarouselIdentifier</a> <a href="#">ApplicationSignaling</a> <a href="#">DataBroadcastId</a> <a href="#">StreamIdentifier</a> <a href="#">AssociationTag</a> <a href="#">PmtPrivateInformation</a> <a href="#">PmtDescriptor</a>						
used by	element	<a href="#">ChannelType/ElementaryStream</a>					
attributes	Name pid	Type <a href="#">pidType</a>	Use required	Default	Fixed	Annotation documentation PID used to carry the elementary stream	
	type	xsd:unsignedByte	optional			documentation stream_type as defined by MPEG-2 and ATSC and carried in the PMT and service location descriptor documentation ID of an audio stream in a channel. Links to an Ac3Audio element.	
	audiold	<a href="#">audioldType</a>	optional				
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Defines an elementary stream, i.e. an MPEG-2 PID. Used to build the service location descriptor and the PMT.						

### element ElementaryStreamType/Name

type	<a href="#">TextType</a>						
properties	isRef	0					
	minOcc	0					
	maxOcc	unbounded					
	content	complex					
attributes	Name lang	Type <a href="#">languageType</a>	Use required	Default	Fixed	Annotation	
	action	<a href="#">actionType</a>	optional				
	error	<a href="#">errorType</a>	optional				
annotation	documentation Elementary stream name, carried in the component name descriptor (A/65B 6.9.8)						

### element ElementaryStreamType/ConditionalAccess

type	<a href="#">ConditionalAccessType</a>						
properties	isRef	0					
	minOcc	0					
	maxOcc	unbounded					
	content	complex					

attributes	Name	Type	Use	Default	Fixed	Annotation
	systemId	<b>xsd:unsignedShort</b>	required			documentation Conditional access system ID
	pid	<a href="#">pidType</a>	optional			documentation EMM or ECM PID, depending on context
	actionError	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Defines the CA systems in use for the elementary stream and the corresponding ECM PIDs					

### element **ElementaryStreamType/CarouselIdentifier**

type	<a href="#">CarouselIdentifierType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	carouselId	<b>xsd:unsignedInt</b>	optional			documentation Identification of the data carousel
	formatId	<a href="#">formatIdType</a>	optional			documentation identify whether the carousel supports the enhanced boot mechanism or not
	moduleId	<b>xsd:unsignedShort</b>	optional			documentation Identifier of the module in the carousel
	blockSize	<b>xsd:unsignedShort</b>	optional			documentation the size in bytes of every block in the module
	moduleSize	<b>xsd:unsignedInt</b>	optional			documentation the size of the module in bytes
	compressionMethod	<b>xsd:unsignedByte</b>	optional			documentation compression algorithm defined in IETF RFC 1950
	originalSize	<b>xsd:unsignedInt</b>	optional			documentation the size of the data (in bytes) carried by the module before it was compressed
	timeOut	<b>xsd:unsignedByte</b>	optional			documentation timeout in seconds for acquisition of all blocks of the module
	objectKey	<b>xsd:unsignedInt</b>	optional			documentation

	<p style="text-align: center;"><b>t</b></p> <p>action <a href="#">actionType</a> optional  error <a href="#">errorType</a> optional</p>	<p>Identify the BIOP message that is the ServiceGateway message</p>
annotation	<p>documentation  Identify the elementary stream that carries the DSI messages of an object carousel (A/101 10.6.2.2)</p>	

**element ElementaryStreamType/ApplicationSignaling**

type	<a href="#">ApplicationSignalingType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	applicationType	<a href="#">applicationType</a>	optional			documentation the application type of an Application Information Table sub-table that is on this elementary stream
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	<p>documentation  Identify the Program Element that contains the AIT (A/101 10.6.2.3)</p>					

**element ElementaryStreamType/DataBroadcastId**

type	<a href="#">DataBroadcastIdType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">ApplicationTypes</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	<p>documentation  Identify the elementary stream that carries the principal component of an object carousel (A/101 10.6.2.4)</p>					

**element ElementaryStreamType/StreamIdentifier**

type	<a href="#">StreamIdentifierType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	componentTag	<b>xsd:unsignedByte</b>	optional			documentation Identifies the component stream for associating it
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			

annotation	documentation Defines the association between a component_tag and a PID (ETSI EN 300 468 V1.5.1 6.2.36)
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### element **ElementaryStreamType/AssociationTag**

type	<a href="#">AssociationTagType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	associationTag	<b>xsd:unsignedShort</b>	optional			documentation Identifies the connection on which the DII message is broadcast
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Defines the Association between an association_tag and a PID (ISO/IEC 13818-6 11.5.2)					

### element **ElementaryStreamType/PmtPrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<b>xsd:unsignedInt</b>	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the inner loop of the PMT					

### element **ElementaryStreamType/PmtDescriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<b>xsd:unsignedByte</b>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the inner loop of the PMT					

### complexType **StreamIdentifierType**

used by	element	<a href="#">ElementaryStreamType/StreamIdentifier</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	componentTag	<b>xsd:unsignedByte</b>	optional			documentation

	<b>yte</b>	Identifies the component stream for associating it
	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	
annotation	documentation Stream Identifier Descriptor (ETSI EN 300 468 V1.5.1 6.2.36)	

**simpleType formatIdType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">CarouselIdentifierType/@formatId</a>
facets	enumeration standard_boot enumeration enhanced_boot
annotation	documentation identify whether the carousel supports the enhanced boot mechanism or not

**complexType Ac3AudioType**

used by	element <a href="#">AudiosType/Ac3Audio</a>																																																
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>audioid</td> <td><a href="#">audioidType</a></td> <td>required</td> <td></td> <td></td> <td>documentation ID of the audio service in the virtual channel. Links to an elementary stream.</td> </tr> <tr> <td>lang</td> <td><a href="#">languageType</a></td> <td>optional</td> <td></td> <td></td> <td>documentation Language of the audio stream carried in the ISO_639_language_descriptor or</td> </tr> <tr> <td>serviceType</td> <td><a href="#">audioServiceType</a></td> <td>optional</td> <td>complete_main</td> <td></td> <td>documentation Audio service type. Complete_main is the default (A/65B 6.9.1)</td> </tr> <tr> <td>numChannels</td> <td><a href="#">numChannelsType</a></td> <td>optional</td> <td>2/0</td> <td></td> <td>documentation Number of audio channels in the elementary stream (A/65B 6.9.1)</td> </tr> <tr> <td>bitRateKbps</td> <td><a href="#">bitRateKbpsType</a></td> <td>optional</td> <td>448</td> <td></td> <td>documentation Bit rate of the elementary stream in kbps (A/65B 6.9.1)</td> </tr> <tr> <td>exactBitRate</td> <td><b>xsd:boolean</b></td> <td>optional</td> <td>false</td> <td></td> <td>documentation Indicates if bitRateKbps is an exact value or an upper bound (A/65B 6.9.1)</td> </tr> <tr> <td>surround</td> <td><b>xsd:boolean</b></td> <td>optional</td> <td></td> <td></td> <td>documentation Indicates if the audio service</td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	audioid	<a href="#">audioidType</a>	required			documentation ID of the audio service in the virtual channel. Links to an elementary stream.	lang	<a href="#">languageType</a>	optional			documentation Language of the audio stream carried in the ISO_639_language_descriptor or	serviceType	<a href="#">audioServiceType</a>	optional	complete_main		documentation Audio service type. Complete_main is the default (A/65B 6.9.1)	numChannels	<a href="#">numChannelsType</a>	optional	2/0		documentation Number of audio channels in the elementary stream (A/65B 6.9.1)	bitRateKbps	<a href="#">bitRateKbpsType</a>	optional	448		documentation Bit rate of the elementary stream in kbps (A/65B 6.9.1)	exactBitRate	<b>xsd:boolean</b>	optional	false		documentation Indicates if bitRateKbps is an exact value or an upper bound (A/65B 6.9.1)	surround	<b>xsd:boolean</b>	optional			documentation Indicates if the audio service
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surround	<b>xsd:boolean</b>	optional			documentation Indicates if the audio service																																												

	fullSvc	<b>xsd:boolean</b>	optional	true	is surround (A/65B 6.9.1) documentation Indicates whether the elementary stream can be decoded alone or must be presented along with other audio streams (A/65B 6.9.1)
	mainid	<a href="#">mainidType</a>	optional		documentation ID of the audio stream, if its fullsvc flag is set to true (A/65B 6.9.1)
	asvcflags	<b>xsd:unsignedByte</b>	optional		documentation If the fullsvc flag is set to false, each bit in this byte indicates with which main audio streams this elementary stream can be presented (A/65B 6.9.1)
	bsid	<a href="#">bsidType</a>	optional	8	documentation Version of the AC-3 standard used by the audio stream. Default is 8 (A/65B 6.9.1)
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional		
annotation	documentation Communicates all the parameters of an audio stream.				

**complexType AudiosType**

children	<a href="#">Null Ac3Audio</a>					
used by	elements	<a href="#">ChannelType/Audios ShowDataType/Audios</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation List of audio services					

**element AudiosType/Null**

properties	isRef 0 content complex
annotation	documentation Means that there is no audio service



element **AudiosType/Ac3Audio**

type	<a href="#">Ac3AudioType</a>					
properties	isRef	0				
	minOcc	1				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	audioid	<a href="#">audioidType</a>	required			documentation ID of the audio service in the virtual channel. Links to an elementary stream.
	lang	<a href="#">languageType</a>	optional			documentation Language of the audio stream carried in the ISO_639_language_descriptor or
	serviceType	<a href="#">audioServiceType</a>	optional	complete_main		documentation Audio service type. Complete_main is the default (A/65B 6.9.1)
	numChannels	<a href="#">numChannelsType</a>	optional	2/0		documentation Number of audio channels in the elementary stream (A/65B 6.9.1)
	bitRateKbps	<a href="#">bitRateKbpsType</a>	optional	448		documentation Bit rate of the elementary stream in kbps (A/65B 6.9.1)
	exactBitRate	xsd:boolean	optional	false		documentation Indicates if bitRateKbps is an exact value or an upper bound (A/65B 6.9.1)
	surround	xsd:boolean	optional			documentation Indicates if the audio service is surround (A/65B 6.9.1)
	fullSvc	xsd:boolean	optional	true		documentation Indicates whether the elementary stream can be decoded alone or must be presented along with other audio streams (A/65B 6.9.1)
	mainid	<a href="#">mainidType</a>	optional			documentation ID of the audio

	asvcflags	<b>xsd:unsignedByte</b>	optional			stream, if its fullsvc flag is set to true (A/65B 6.9.1) documentation If the fullsvc flag is set to false, each bit in this byte indicates with which main audio streams this elementary stream can be presented (A/65B 6.9.1) documentation
	bsid	<a href="#">bsidType</a>	optional	8		Version of the AC-3 standard used by the audio stream. Default is 8 (A/65B 6.9.1) documentation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Individual audio service					

### simpleType **audioServiceType**

type	restriction of <b>xsd:string</b>					
used by	attribute <a href="#">Ac3AudioType/@serviceType</a>					
facets	enumeration	complete_main				
	enumeration	music_and_effects				
	enumeration	visually_impaired				
	enumeration	hearing_impaired				
	enumeration	dialogue				
	enumeration	commentary				
	enumeration	emergency				
	enumeration	voice_over				
annotation	documentation Possible audio service types (A/65B 6.9.1)					

### simpleType **bitRateKbpsType**

type	restriction of <b>xsd:unsignedShort</b>					
used by	attribute <a href="#">Ac3AudioType/@bitRateKbps</a>					
facets	maxInclusive	448				
annotation	documentation Type for bit rate of AC-3 elementary stream in kbps (A/65B 6.9.1)					

### simpleType **bsidType**

type	restriction of <b>xsd:unsignedByte</b>					
used by	attribute <a href="#">Ac3AudioType/@bsid</a>					
facets	maxExclusive	32				
annotation	documentation Type for version of AC-3 standard used by an AC-3 audio stream (A/65B 6.9.1)					

**simpleType mainidType**

type	restriction of <b>xsd:unsignedByte</b>
used by	attribute <a href="#">Ac3AudioType/@mainid</a>
facets	maxExclusive 8
annotation	documentation Type for mainid of an AC-3 audio stream (A/65B 6.9.1)

**simpleType numChannelsType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">Ac3AudioType/@numChannels</a>
facets	enumeration 1/0 enumeration 2/0 enumeration 3/0 enumeration 2/1 enumeration 3/1 enumeration 2/2 enumeration 3/2 enumeration 1 enumeration 2_or_less enumeration 3_or_less enumeration 4_or_less enumeration 5_or_less enumeration 6_or_less
annotation	documentation Possible values for the number of audio channels in an AC-3 elementary stream (A/65B 6.9.1)

**complexType DimensionType**

children	<a href="#">Name Value</a>																		
used by	element <a href="#">RegionType/Dimension</a>																		
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>graduatedScale</td> <td><b>xsd:boolean</b></td> <td>required</td> <td></td> <td></td> <td>documentation Indicates if the dimension is graduated</td> </tr> <tr> <td>action error</td> <td><a href="#">actionType</a> <a href="#">errorType</a></td> <td>optional optional</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	graduatedScale	<b>xsd:boolean</b>	required			documentation Indicates if the dimension is graduated	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
Name	Type	Use	Default	Fixed	Annotation														
graduatedScale	<b>xsd:boolean</b>	required			documentation Indicates if the dimension is graduated														
action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional																	
annotation	documentation Type for a dimension in a rating region																		

**element DimensionType/Name**

type	<a href="#">TextType</a>																		
properties	isRef 0 content complex																		
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>lang</td> <td><a href="#">languageType</a></td> <td>required</td> <td></td> <td></td> <td></td> </tr> <tr> <td>action error</td> <td><a href="#">actionType</a> <a href="#">errorType</a></td> <td>optional optional</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	lang	<a href="#">languageType</a>	required				action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
Name	Type	Use	Default	Fixed	Annotation														
lang	<a href="#">languageType</a>	required																	
action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional																	
annotation	documentation Name of the dimension																		

element **DimensionType/Value**

type	<a href="#">RatingValueType</a>					
properties	isRef	0				
	minOcc	1				
	maxOcc	15				
	content	complex				
children	<a href="#">AbbrevName</a> <a href="#">Name</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Possible values for a given dimension					

complexType **ParentalRatingType**

children	<a href="#">Null</a> <a href="#">Rating</a>					
used by	elements	<a href="#">ChannelType/ParentalRating</a> <a href="#">ShowDataType/ParentalRating</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	region	xsd:unsignedByte	required			documentation Rating region, as defined by the ATSC Code Point Registry
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Ratings for one region in Content Advisory Descriptor (A/65B 6.9.4)					

element **ParentalRatingType/Null**

properties	isRef	0				
	content	complex				
annotation	documentation Means that there is no rating for the given region					

element **ParentalRatingType/Rating**

type	<a href="#">RatingType</a>					
properties	isRef	0				
	minOcc	1				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	dimension	xsd:string	required			documentation Name of the dimension
	value	xsd:string	optional			documentation Name of the rating value
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Individual rating dimensions					

complexType **RatingsType**

children	<a href="#">Region</a>					
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used by	element	<a href="#">PmcpMessage/Ratings</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
annotation	error	<a href="#">errorType</a>	optional			
	documentation	Describes the ratings system and is used to build the Rating Region Table (A/65B 6.4)				

### element RatingsType/Region

type	<a href="#">RegionType</a>					
properties	isRef	0				
	minOcc	1				
	maxOcc	255				
	content	complex				
children	<a href="#">Name</a> <a href="#">Dimension</a> <a href="#">PrivateInformation</a> <a href="#">Descriptor</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	id	<b>xsd:unsignedByte</b>	required			documentation Region ID, as defined by the ATSC Code Point Registry
	action	<a href="#">actionType</a>	optional			
annotation	error	<a href="#">errorType</a>	optional			
	documentation	Rating system for one region				

### complexType RatingType

used by	element	<a href="#">ParentalRatingType/Rating</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	dimension	<b>xsd:string</b>	required			documentation Name of the dimension
	value	<b>xsd:string</b>	optional			documentation Name of the rating value
annotation	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
documentation	Rating for one dimension in Content Advisory Descriptor (A/65B 6.9.4)					

### complexType RatingValueType

children	<a href="#">AbbrevName</a> <a href="#">Name</a>					
used by	element	<a href="#">DimensionType/Value</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
annotation	error	<a href="#">errorType</a>	optional			
	documentation	Type for a rating value				

### element RatingValueType/AbbrevName

type	<a href="#">TextType</a>					
properties	isRef	0				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
annotation	error	<a href="#">errorType</a>	optional			

annotation	documentation Abbreviated name of the value
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**element RatingValueType/Name**

type	<a href="#">TextType</a>					
properties	isRef	0				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Long name of the value					

**complexType RegionType**

children	<a href="#">Name</a> <a href="#">Dimension</a> <a href="#">PrivateInformation</a> <a href="#">Descriptor</a>					
used by	element	<a href="#">RatingsType/Region</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	id	<b>xsd:unsignedByte</b>	required			documentation Region ID, as defined by the ATSC Code Point Registry
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Type for the rating system of a region					

**element RegionType/Name**

type	<a href="#">TextType</a>					
properties	isRef	0				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Name of the region					

**element RegionType/Dimension**

type	<a href="#">DimensionType</a>					
properties	isRef	0				
	minOcc	1				
	maxOcc	255				
	content	complex				
children	<a href="#">Name</a> <a href="#">Value</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	graduatedScale	<b>xsd:boolean</b>	required			documentation Indicates if the dimension is graduated
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Existing dimensions for the region					

element **RegionType/PrivateInformation**

type	<a href="#">PrivateInformationType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
facets	maxLength	251				
attributes	Name	Type	Use	Default	Fixed	Annotation
	formatIdentifier	<a href="#">xsd:unsignedInt</a>	required			documentation Format Identifier registered by SMPTE
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the outer loop of the RRT					

element **RegionType/Descriptor**

type	<a href="#">DescriptorType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	descriptorTag	<a href="#">xsd:unsignedByte</a>	required			documentation Descriptor tag
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation These descriptors go into the outer loop of the RRT					

complexType **Caption608Type**

used by	element	<a href="#">CaptionsType/Caption608</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Used to indicate the presence of 608 line 21 analog captions					

complexType **Caption708Type**

used by	element	<a href="#">CaptionsType/Caption708</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	service	<a href="#">ccServiceType</a>	required			documentation 708 captions service number
	lang	<a href="#">languageType</a>	optional			documentation Language of the caption service
	wideAspectRatio	<a href="#">xsd:boolean</a>	optional			documentation Indicates the aspect ratio for which the caption service has been

	easyReader	xsd:boolean	optional				formatted documentation Indicates if the caption service is formatted for beginner readers.
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Describes a 708 DTVCC digital captions service						

**complexType CaptionsType**

children	<a href="#">Null</a> <a href="#">Caption608</a> <a href="#">Caption708</a>						
used by	elements	<a href="#">ChannelType/Captions</a> <a href="#">ShowDataType/Captions</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Caption Service Descriptor (A/65B 6.9.3)						

**element CaptionsType/Null**

properties	isRef	0					
	minOcc	0					
	maxOcc	1					
	content	complex					
annotation	documentation Means that there is no caption service						

**element CaptionsType/Caption608**

type	<a href="#">Caption608Type</a>						
properties	isRef	0					
	minOcc	0					
	maxOcc	1					
	content	complex					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Indicates that analog captions are present						

**element CaptionsType/Caption708**

type	<a href="#">Caption708Type</a>						
properties	isRef	0					
	minOcc	0					
	maxOcc	16					
	content	complex					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	service	<a href="#">ccServiceType</a>	required			documentation 708 captions service number	
	lang	<a href="#">languageType</a>	optional			documentation Language of the caption service	
	wideAspectRatio	xsd:boolean	optional			documentation Indicates the	



	<p>easyReader      <b>xsd:boolean</b>      optional</p> <p>action error      <a href="#">actionType</a>      optional</p> <p>   <a href="#">errorType</a>      optional</p>	<p>aspect ratio for which the caption service has been formatted documentation Indicates if the caption service is formatted for beginner readers.</p>
annotation	<p>documentation Describe digital captions services</p>	

**simpleType ccServiceType**

type	restriction of <b>xsd:unsignedByte</b>
used by	attribute <a href="#">Caption708Type/@service</a>
facets	<p>minInclusive 1</p> <p>maxInclusive 63</p>
annotation	<p>documentation Type for 708 caption service number (A/65B 6.9.3 caption_service_number)</p>

**complexType ShowDataType**

children	<a href="#">Name</a> <a href="#">Description</a> <a href="#">ParentalRating</a> <a href="#">Audios</a> <a href="#">Captions</a> <a href="#">RedistributionControl</a> <a href="#">DataBroadcast</a>					
used by	elements	<a href="#">PspipEventType/ShowData</a> <a href="#">ShowType/ShowData</a>				
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	<p>documentation Describes the metadata of a show</p>					

**element ShowDataType/Name**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang action error	<a href="#">languageType</a> <a href="#">actionType</a> <a href="#">errorType</a>	required optional optional			
annotation	<p>documentation Multiple-language title of the show (A/65B 6.5)</p>					

**element ShowDataType/Description**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang action error	<a href="#">languageType</a> <a href="#">actionType</a> <a href="#">errorType</a>	required optional optional			

annotation	documentation Multiple-language description of the show carried in the Event ETT (A/65B 6.6)
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### element ShowDataType/ParentalRating

type	<a href="#">ParentalRatingType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	unbounded				
	content	complex				
children	<a href="#">Null Rating</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	region	<b>xsd:unsignedByte</b>	required			documentation Rating region, as defined by the ATSC Code Point Registry
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Parental rating of the show for one region					

### element ShowDataType/Audios

type	<a href="#">AudiosType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Null Ac3Audio</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Audio services associated with the show					

### element ShowDataType/Captions

type	<a href="#">CaptionsType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Null Caption608</a> <a href="#">Caption708</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Caption services associated with the show					

### element ShowDataType/RedistributionControl

type	<a href="#">RedistributionControlType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Null</a>					

attributes	Name action error	Type <a href="#">actionType</a> <a href="#">errorType</a>	Use optional optional	Default	Fixed	Annotation
annotation	documentation Sets the "broadcast flag" of the show					

### element **ShowDataType/DataBroadcast**

type	<a href="#">DataBroadcastType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
children	<a href="#">Description</a> <a href="#">ObjectName</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	dataBroadcastId	<b>xsd:unsignedShort</b>	optional			documentation Identifies the data broadcast specification that is used to broadcast the data in the broadcast network
	componentTag	<b>xsd:unsignedByte</b>	optional			documentation Identifies the component stream for associating it
	carouselTypeId	<a href="#">carouselTypeIdType</a>	optional			documentation Indicates which kind of carousel is used
	transactionId	<b>xsd:unsignedInt</b>	optional			documentation Indicates the same value as the transactionId value of the DownloadServiceInitiate message that carries the object reference of the service gateway
	time_out_value_DSI	<b>xsd:unsignedShort</b>	optional			documentation Indicates the recommended time out period in milliseconds that receivers should use to time out the acquisition of the DownloadServiceInitiate message
	time_out_value_DII	<b>xsd:unsignedShort</b>	optional			documentation Indicates the recommended time out period in milliseconds that receivers

	leakRate	<a href="#">leakRateType</a>	optional					should use to time out the acquisition of the DownloadIndfndication message documentation Indicates the leak rate Rxn of the data carousel decoder model that is applied by the service
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional					
annotation	documentation Data Broadcasting Descriptor							

### complexType ShowType

children	<a href="#">ContentId</a> <a href="#">ShowData</a> <a href="#">PrivatePmcpInformation</a>						
used by	element	<a href="#">PmcpMessage/Show</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Describes a show, i.e. an abstract entity which becomes a PSIP Event when it is scheduled						

### element ShowType/ContentId

type	<a href="#">ContentIdType</a>						
properties	isRef	0					
	content	complex					
children	<a href="#">Isan</a> <a href="#">HouseNumber</a> <a href="#">AlternateId</a> <a href="#">HouseNumber</a> <a href="#">AlternateId</a> <a href="#">AlternateId</a>						
attributes	Name	Type	Use	Default	Fixed	Annotation	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Communicates at least one of the possible IDs for the show						

### element ShowType/ShowData

type	<a href="#">ShowDataType</a>						
properties	isRef	0					
	content	complex					
children	<a href="#">Name</a> <a href="#">Description</a> <a href="#">ParentalRating</a> <a href="#">Audios</a> <a href="#">Captions</a> <a href="#">RedistributionControl</a> <a href="#">DataBroadcast</a>						
attributes	Name	Type	Use	Default	Fixed	Annotation	
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional				
annotation	documentation Carries the actual information about the show						

### element ShowType/PrivatePmcpInformation

type	<a href="#">PrivatePmcpInformationType</a>						
properties	isRef	0					
	minOcc	0					
	maxOcc	1					

	content complex
annotation	documentation Show-level PMCP-private information

**complexType AlternateIdType**

type	extension of <b>xsd:string</b>					
properties	base <b>xsd:string</b>					
used by	elements <a href="#">ContentIdType/AlternateId</a> <a href="#">ContentIdType/AlternateId</a> <a href="#">ContentIdType/AlternateId</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	idType	<b>xsd:string</b>	required			documentation This attribute uniquely identifies the type of alternate Id communicated in the element
attributes	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Any proprietary string other than the house number used to identify the material locally or globally					

**complexType ContentIdType**

children	<a href="#">Isan</a> <a href="#">HouseNumber</a> <a href="#">AlternateId</a> <a href="#">HouseNumber</a> <a href="#">AlternateId</a> <a href="#">AlternateId</a>					
used by	elements <a href="#">PspipEventType/AcapContentId</a> <a href="#">PspipDataEventType/AcapContentId</a> <a href="#">AcapDataServiceType/AcapContentId</a> <a href="#">PspipEventType/ContentId</a> <a href="#">ShowType/ContentId</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action	<a href="#">actionType</a>	optional			
attributes	error	<a href="#">errorType</a>	optional			
	annotation	documentation Groups several content IDs that may be used simultaneously to label and reference a show				

**element ContentIdType/Isan**

type	<a href="#">IsanType</a>					
properties	isRef	0				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	root	<a href="#">isanRootType</a>	required			
	episodeOrPart	<a href="#">isanEpisodeType</a>	optional			
	check1	<a href="#">isanCheckType</a>	optional			
	version	<a href="#">isanVersionType</a>	optional			
	check2	<a href="#">isanCheckType</a>	optional			
attributes	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation V-ISAN, as defined by ISO.					

**element ContentIdType/HouseNumber**

type	<a href="#">HouseNumberType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				

attributes	Name action error	Type <a href="#">actionType</a> <a href="#">errorType</a>	Use optional optional	Default	Fixed	Annotation
------------	-------------------------	---	-----------------------------	---------	-------	------------

#### element ContentIdType/AlternateId

type	<a href="#">AlternateIdType</a>					
properties	isRef minOcc maxOcc content	0 0 unbounded complex				
attributes	Name idType	Type <b>xsd:string</b>	Use required	Default	Fixed	Annotation documentation This attribute uniquely identifies the type of alternate Id communicated in the element
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			

#### element ContentIdType/HouseNumber

type	<a href="#">HouseNumberType</a>					
properties	isRef content	0 complex				
attributes	Name action error	Type <a href="#">actionType</a> <a href="#">errorType</a>	Use optional optional	Default	Fixed	Annotation
annotation	documentation Legacy string used to identify the material locally to a station					

#### element ContentIdType/AlternateId

type	<a href="#">AlternateIdType</a>					
properties	isRef minOcc maxOcc content	0 0 unbounded complex				
attributes	Name idType	Type <b>xsd:string</b>	Use required	Default	Fixed	Annotation documentation This attribute uniquely identifies the type of alternate Id communicated in the element
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			

#### element ContentIdType/AlternateId

type	<a href="#">AlternateIdType</a>					
properties	isRef minOcc maxOcc content	0 1 unbounded complex				
attributes	Name idType	Type <b>xsd:string</b>	Use required	Default	Fixed	Annotation documentation

	action <a href="#">actionType</a> optional error <a href="#">errorType</a> optional	This attribute uniquely identifies the type of alternate Id communicated in the element
annotation	documentation Any proprietary string other than the house number used to identify the material locally or globally	

**complexType HouseNumberType**

type	extension of <b>xsd:string</b>					
properties	base <b>xsd:string</b>					
used by	elements <a href="#">ContentIdType/HouseNumber</a> <a href="#">ContentIdType/HouseNumber</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	action error	<a href="#">actionType</a> <a href="#">errorType</a>	optional optional			
annotation	documentation Legacy string used to identify the material locally to a station					

**complexType DataBroadcastType**

children	<a href="#">Description</a> <a href="#">ObjectName</a>					
used by	elements <a href="#">PspipDataEventType/DataBroadcast</a> <a href="#">ShowDataType/DataBroadcast</a>					
attributes	Name	Type	Use	Default	Fixed	Annotation
	dataBroadcastId	<b>xsd:unsignedShort</b>	optional			documentation Identifies the data broadcast specification that is used to broadcast the data in the broadcast network
	componentTag	<b>xsd:unsignedByte</b>	optional			documentation Identifies the component stream for associating it
	carouselTypeId	<a href="#">carouselTypeIdType</a>	optional			documentation Indicates which kind of carousel is used
	transactionId	<b>xsd:unsignedInt</b>	optional			documentation Indicates the same value as the transactionId value of the DownloadServiceInitiate message that carries the object reference of the service gateway
	time_out_value_DSI	<b>xsd:unsignedShort</b>	optional			documentation Indicates the recommended

	<p>time_out_value_ <b>xsd:unsignedS</b> optional                  DII <b>hort</b></p> <p>leakRate <a href="#">leakRateType</a> optional</p> <p>action <a href="#">actionType</a> optional                  error <a href="#">errorType</a> optional</p>	<p>time out period in milliseconds that receivers should use to time out the acquisition of the DownloadServerInitiate message documentation Indicates the recommended time out period in milliseconds that receivers should use to time out the acquisition of the DownloadInfoIndication message documentation Indicates the leak rate Rxn of the data carousel decoder model that is applied by the service</p>
annotation	documentation Data Broadcasting Descriptor	

**element DataBroadcastType/Description**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Indicates text description of the data component					

**element DataBroadcastType/ObjectName**

type	<a href="#">TextType</a>					
properties	isRef	0				
	minOcc	0				
	maxOcc	1				
	content	complex				
attributes	Name	Type	Use	Default	Fixed	Annotation
	lang	<a href="#">languageType</a>	required			
	action	<a href="#">actionType</a>	optional			
	error	<a href="#">errorType</a>	optional			
annotation	documentation Indicates the name of the object to be used to start up the higher layer protocols					



**simpleType carouselType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">DataBroadcastType/@carouselType</a>
facets	enumeration <code>one_layer</code> enumeration <code>two_layer</code>
annotation	documentation Indicates which kind of carousel is used

**simpleType leakRateType**

type	restriction of <b>xsd:unsignedInt</b>
used by	attribute <a href="#">DataBroadcastType/@leakRate</a>
facets	maxExclusive <code>4194303</code>
annotation	documentation Indicates the leak rate Rxn of the data carousel decoder model that is applied by the service

**complexType isanType**

used by	element <a href="#">ContentIdType/Isan</a>																																																
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>root</td> <td><a href="#">isanRootType</a></td> <td>required</td> <td></td> <td></td> <td></td> </tr> <tr> <td>episodeOrPart</td> <td><a href="#">isanEpisodeType</a></td> <td>optional</td> <td></td> <td></td> <td></td> </tr> <tr> <td>check1</td> <td><a href="#">isanCheckType</a></td> <td>optional</td> <td></td> <td></td> <td></td> </tr> <tr> <td>version</td> <td><a href="#">isanVersionType</a></td> <td>optional</td> <td></td> <td></td> <td></td> </tr> <tr> <td>check2</td> <td><a href="#">isanCheckType</a></td> <td>optional</td> <td></td> <td></td> <td></td> </tr> <tr> <td>action</td> <td><a href="#">actionType</a></td> <td>optional</td> <td></td> <td></td> <td></td> </tr> <tr> <td>error</td> <td><a href="#">errorType</a></td> <td>optional</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	root	<a href="#">isanRootType</a>	required				episodeOrPart	<a href="#">isanEpisodeType</a>	optional				check1	<a href="#">isanCheckType</a>	optional				version	<a href="#">isanVersionType</a>	optional				check2	<a href="#">isanCheckType</a>	optional				action	<a href="#">actionType</a>	optional				error	<a href="#">errorType</a>	optional			
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check2	<a href="#">isanCheckType</a>	optional																																															
action	<a href="#">actionType</a>	optional																																															
error	<a href="#">errorType</a>	optional																																															
annotation	documentation V-ISAN, as defined by ISO. Only the root is required, allowing its use as an ISAN or even to reference all episodes																																																

**simpleType isanCheckType**

type	restriction of <b>xsd:string</b>
used by	attributes <a href="#">IsanType/@check1</a> <a href="#">IsanType/@check2</a>
facets	pattern <code>[\dA-Za-z]</code>
annotation	documentation Type for the check digits of a V-ISAN

**simpleType isanEpisodeType**

type	restriction of <b>xsd:string</b>
used by	attribute <a href="#">IsanType/@episodeOrPart</a>
facets	pattern <code>[\dA-Fa-f]{4}</code>
annotation	documentation Type for the episode part of an ISAN or V-ISAN

**simpleType isanRootType**

type	restriction of <b>xsd:string</b>
------	----------------------------------

used by	attribute <a href="#">IsanType/@root</a>
facets	pattern <code>[\dA-Fa-f]{4}-[\dA-Fa-f]{4}-[\dA-Fa-f]{4}</code>
annotation	documentation Type for the root part of an ISAN or V-ISAN

**simpleType isanVersionType**

type	restriction of <code>xsd:string</code>
used by	attribute <a href="#">IsanType/@version</a>
facets	pattern <code>[\dA-Fa-f]{4}-[\dA-Fa-f]{4}</code>
annotation	documentation Type for the version part of a V-ISAN

## Annex B: PMCP Use Cases (Informative)

Printouts of sample PMCP XML documents are provided below to illustrate the use of some of the PMCP messages:

- HeartbeatRequest.xml
- HeartbeatReply.xml
- ErrorMessage.xml
- ScheduleDownload.xml
- ScheduleRead.xml
- DurationChange.xml
- EventNameChange.xml
- ShowNameChange.xml
- EventShift.xml
- Captions.xml
- AudioInformationStart.xml
- AudioInformationNext.xml
- AudioInformationStop.xml
- PrivateInformation.xml
- ACAPDataService.xml
- ACAP\_PsipEvent\_Add.xml

### HeartbeatRequest.xml

```
<!--Sample PMCP document showing how to send a heartbeat request-->
<PmcpMessage xmlns="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0" id="12345" origin="automation_main"
originType="Automation" destination="psip_generator" dateTime="2009-12-16T09:30:47-05:00" type="request"/>
```

### HeartbeatReply.xml

```
<!--Sample PMCP document showing how to reply to a heartbeat request-->
<PmcpMessage xmlns="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0" id="17365" origin="psip_generator"
originType="Table_Generator" destination="automation_main" dateTime="2009-12-16T09:30:48-05:00" type="reply">
  <PmcpReply id="12345" origin="automation_main" destination="psip_generator" dateTime="2009-12-16T09:30:47-
05:00" status="OK"/>
</PmcpMessage>
```

### ErrorMessage.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP showing an error message-->
<PmcpMessage xmlns="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0" id="4294967295" origin="PspGenerator"
originType="Table_Generator" dateTime="2009-12-17T09:30:47-05:00">
  <PmcpReply id="5464758" origin="Traffic" dateTime="2009-12-17T09:30:45-05:00" status="error"/>
  <PspEvent>
    <EventId channelNumber="56-3">
      <PmcpEventId creator="Traffic" id="657484"/>
    </EventId>
    <ShowData error="Name_missing"/>
  </PspEvent>
  <PspEvent error="element_does_not_exist">
```

```

<EventId channelNumber="56-3">
  <PmcpEventId creator="Traffic" id="657485"/>
</EventId>
</PspEvent>
<PspEvent error="ShowData_change_denied duration_out_of_range">
  <EventId channelNumber="56-3">
    <PmcpEventId creator="Traffic" id="657486"/>
  </EventId>
</PspEvent>
</PmcpMessage>

```

## ScheduleDownload.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP file showing an initial schedule download-->
<PmcpMessage xmlns="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0" id="4294967295" origin="Listing Service"
originType="Listing_Service" dateTime="2000-12-16T09:30:47-05:00" destination="PSIP Generator">
  <PspEvent action="add" duration="PT30M">
    <EventId channelNumber="57-2">
      <InitialSchedule startTime="2000-12-16T10:00:00-05:00"/>
    </EventId>
    <ShowData>
      <Name lang="eng">Barney & Friends</Name>
      <Description lang="eng">Exercise/Dance</Description>
      <ParentalRating region="1">
        <Rating dimension="Children" value="TV-Y"/>
      </ParentalRating>
      <Audios>
        <Ac3Audio audioid="1" lang="eng"/>
      </Audios>
      <Captions>
        <Caption708 service="1" lang="eng"/>
      </Captions>
    </ShowData>
  </PspEvent>
  <PspEvent action="add" duration="PT30M">
    <EventId channelNumber="57-2">
      <InitialSchedule startTime="2000-12-16T10:30:00-05:00"/>
    </EventId>
    <ShowData>
      <Name lang="eng">Dragon Tales</Name>
      <Description lang="eng">Crash Landings/The Big Cake Mix-Up</Description>
      <ParentalRating region="1">
        <Rating dimension="Children" value="TV-Y"/>
      </ParentalRating>
      <Audios>
        <Ac3Audio audioid="1" lang="eng"/>
        <Ac3Audio audioid="2" lang="spa"/>
      </Audios>
      <Captions>
        <Caption708 service="1" lang="eng"/>
      </Captions>
    </ShowData>
  </PspEvent>
  <PspEvent action="add" duration="PT30M">
    <EventId channelNumber="57-2">
      <InitialSchedule startTime="2000-12-16T11:00:00-05:00"/>
    </EventId>
    <ShowData>
      <Name lang="eng">Between The Lions</Name>
      <Description lang="eng">Pecos Bill Cleans Up The West</Description>
      <ParentalRating region="1">
        <Rating dimension="Children" value="TV-Y"/>
      </ParentalRating>
      <Audios>

```

```

        <Ac3Audio audioid="1" lang="eng"/>
        <Ac3Audio audioid="2" lang="eng" serviceType="visually_impaired"/>
    </Audios>
    <Captions>
        <Caption708 service="1" lang="eng"/>
    </Captions>
</ShowData>
</PspEvent>
<PspEvent action="add" duration="PT30M">
<EventId channelId="57-2">
    <InitialSchedule startTime="2000-12-16T11:30:00-05:00"/>
</EventId>
<ShowData>
    <Name lang="eng">Arthur</Name>
    <Description lang="eng">My Music Rules/That's A Baby Show</Description>
    <ParentalRating region="1">
        <Rating dimension="Children" value="TV-Y"/>
    </ParentalRating>
    <Audios>
        <Ac3Audio audioid="1" lang="eng"/>
        <Ac3Audio audioid="2" lang="eng" serviceType="visually_impaired"/>
    </Audios>
    <Captions>
        <Caption708 service="1" lang="eng"/>
    </Captions>
</ShowData>
</PspEvent>
<PspEvent action="add" duration="PT30M">
<EventId channelId="57-2">
    <InitialSchedule startTime="2000-12-16T12:00:00-05:00"/>
</EventId>
<ShowData>
    <Name lang="eng">Nova</Name>
    <Description lang="eng">Dying to Be Thin</Description>
    <ParentalRating region="1">
        <Rating dimension="Entire Audience" value="TV-PG"/>
    </ParentalRating>
    <Audios>
        <Ac3Audio audioid="1" lang="eng"/>
        <Ac3Audio audioid="2" lang="eng" serviceType="visually_impaired"/>
    </Audios>
    <Captions>
        <Caption708 service="1" lang="eng"/>
    </Captions>
</ShowData>
</PspEvent>
<PspEvent action="add" duration="PT30M">
<EventId channelId="57-2">
    <InitialSchedule startTime="2000-12-16T12:30:00-05:00"/>
</EventId>
<ShowData>
    <Name lang="eng">Great Food</Name>
    <Description lang="eng">Rick Stein's "Toddlers Can Cook!"</Description>
    <ParentalRating region="1">
        <Rating dimension="Entire Audience" value="TV-G"/>
    </ParentalRating>
    <Audios>
        <Ac3Audio audioid="1" lang="eng"/>
    </Audios>
    <Captions>
        <Caption708 service="1" lang="eng"/>
    </Captions>
</ShowData>
</PspEvent>
<PspEvent action="add" duration="PT3H">
<EventId channelId="57-3">

```

```

    <InitialSchedule startTime="2000-12-16T10:00:00-05:00"/>
  </EventId>
</ShowData>
<Name lang="eng">PBS Kids Bookworm Bunch</Name>
<ParentalRating region="1">
  <Rating dimension="Children" value="TV-Y"/>
</ParentalRating>
<Audios>
  <Ac3Audio audioid="1" lang="eng"/>
</Audios>
<Captions>
  <Caption708 service="1" lang="eng"/>
</Captions>
</ShowData>
</PspEvent>
</PmcpMessage>

```

### ScheduleRead.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP document showing how to read ("pull") a portion of the schedule information for a channel-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="3297993104" origin="PspGenerator"
originType="Table_Generator" dateTime="2009-12-17T09:30:47-05:00" type="request">
  <PspEvent action="read" duration="PT24H">
    <EventId channelNumber="34-3">
      <InitialSchedule startTime="2009-12-18T00:00:00-05:00"/>
    </EventId>
  </PspEvent>
</PmcpMessage>

```

### DurationChange.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP document showing how to change the duration of an event-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="4294967295" origin="Traffic"
originType="Traffic" dateTime="2009-12-17T09:30:47-05:00">
  <PspEvent action="update" duration="PT1H19M" durationFrame="17">
    <EventId channelNumber="57-1">
      <InitialSchedule startTime="2000-12-16T10:00:00-05:00"/>
    </EventId>
  </PspEvent>
</PmcpMessage>

```

### EventNameChange.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP document showing how to change the name of an event using its initial scheduled start time as a
reference-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="4294967295" origin="Traffic"
originType="Traffic" dateTime="2009-12-17T09:30:47-05:00">
  <PspEvent>
    <EventId channelNumber="57-1">
      <InitialSchedule startTime="2000-12-16T10:00:00-05:00"/>
    </EventId>
    <ShowData>
      <Name lang="eng" action="update">Welcome to Sesame Street</Name>
    </ShowData>
  </PspEvent>
</PmcpMessage>

```

### ShowNameChange.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP document showing how to change the name of a show-->

```

```
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="4294967295" origin="Traffic"
originType="Traffic" dateTime="2009-12-17T09:30:47-05:00">
  <Show action="update">
    <ContentId>
      <Isan root="2B1A-FF17-3E20" episodeOrPart="6541" check1="7" version="48CD-78B1" check2="B"/>
    </ContentId>
    <ShowData>
      <Name lang="eng" action="update">Welcome to Sesame Street</Name>
    </ShowData>
  </Show>
</PmcpMessage>
```

### EventShift.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP document showing how to change the start time of an event using the initial scheduled start time as a
reference-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="4294967295" origin="Traffic"
originType="Traffic" dateTime="2009-12-17T09:30:47-05:00">
  <PspipEvent action="update" startTime="2000-12-16T11:00:00-05:00" startFrame="15">
    <EventId channelNumber="57-1">
      <InitialSchedule startTime="2000-12-16T10:00:00-05:00"/>
    </EventId>
  </PspipEvent>
</PmcpMessage>
```

### Captions.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP document showing various caption services-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="4947205" origin="Traffic"
originType="Traffic" dateTime="2009-12-18T09:32:47Z">
  <PspipEvent duration="PT30M" action="add">
    <EventId channelNumber="57-3">
      <InitialSchedule startTime="2009-12-18T09:40:00Z"/>
    </EventId>
    <ShowData>
      <Name lang="eng">Caillou</Name>
      <Description lang="eng">Big Brother Caillou</Description>
      <ParentalRating region="1">
        <Rating dimension="Children" value="TV-Y"/>
      </ParentalRating>
      <Audios>
        <Ac3Audio audioid="1" lang="eng"/>
      </Audios>
      <Captions>
        <Caption608/>
        <Caption708 service="1" lang="eng"/>
        <Caption708 service="9" lang="spa"/>
        <Caption708 service="10" lang="fre"/>
        <Caption708 service="59" lang="ger"/>
        <Caption708 service="60" lang="ita"/>
        <Caption708 service="63" lang="por"/>
      </Captions>
    </ShowData>
  </PspipEvent>
</PmcpMessage>
```

### AudioInformationStart.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!--Channel information (overrides current event)-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="3294967567" origin="AC-3 audio encoder"
originType="Metadata_Extractor" dateTime="2009-12-17T09:30:47-05:00">
```

```

<Channel channelNumber="57-2">
  <Audios>
    <Ac3Audio action="add" audioid="1" lang="eng" numChannels="3/2" surround="true"/>
  </Audios>
</Channel>
</PmcpMessage>

```

### AudioInformationNext.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Channel information (overrides current event)-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="3294967568" origin="AC-3 audio encoder"
originType="Metadata_Extractor" dateTime="2009-12-17T09:31:03-05:00">
  <Channel channelNumber="57-2">
    <Audios>
      <Ac3Audio action="add" audioid="1" lang="spa" numChannels="2/0" surround="false"/>
    </Audios>
  </Channel>
</PmcpMessage>

```

### AudioInformationStop.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Channel information cancelled (current event used again)-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0" id="3294967568" origin="AC-3 audio encoder"
originType="Metadata_Extractor" dateTime="2009-12-17T09:31:03-05:00">
  <Channel channelNumber="57-2">
    <Audios>
      <Ac3Audio action="remove" audioid="1"/>
    </Audios>
  </Channel>
</PmcpMessage>

```

### PrivateInformation.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP document showing how to send some private information using the PMCP protocol-->
<PmcpMessage xmlns="http://www.atsc.org/ XMLSchemas/pmcp/2006/3.0"
xmlns:pri="http://www.vendor.com/pmcpExtensions/1.0" id="1" origin="SIMS(1)" originType="Program_Management"
dateTime="2009-07-28T15:00:00">
  <PrivatePmcpInformation>
    <pri:PvtTable-Name>Segment Classes</pri:PvtTable-Name>
    <pri:PvtTable-Layout>
      <pri:PvtColumn PvtColumn-Name="code" PvtColumn-Type="char(3)"/>
      <pri:PvtColumn PvtColumn-Name="description" PvtColumn-Type="char(30)"/>
      <pri:PvtColumn PvtColumn-Name="active" PvtColumn-Type="char(1)"/>
      <pri:PvtColumn PvtColumn-Name="special_order_only" PvtColumn-Type="char(1)"/>
    </pri:PvtTable-Layout>
    <pri:PvtTable-Record>
      <pri:PvtColumn PvtColumn-Name="code" PvtColumn-Value="NB"/>
      <pri:PvtColumn PvtColumn-Name="description" PvtColumn-Value="News Break"/>
      <pri:PvtColumn PvtColumn-Name="active" PvtColumn-Value="Y"/>
      <pri:PvtColumn PvtColumn-Name="special_order_only" PvtColumn-Value="N"/>
    </pri:PvtTable-Record>
    <pri:PvtTable-Record>
      <pri:PvtColumn PvtColumn-Name="code" PvtColumn-Value="NC"/>
      <pri:PvtColumn PvtColumn-Name="description" PvtColumn-Value="No Cops - All day"/>
      <pri:PvtColumn PvtColumn-Name="active" PvtColumn-Value="Y"/>
      <pri:PvtColumn PvtColumn-Name="special_order_only" PvtColumn-Value="N"/>
    </pri:PvtTable-Record>
  </PrivatePmcpInformation>
</PmcpMessage>

```

### ACAP DataService.xml



```

<?xml version="1.0" encoding="UTF-8" ?>
- <!--
Sample PMCP file for Damo, Two Directory
-->
- <PmcpMessage id="100004" origin="Streaming_Controller" originType="Traffic" dateTime="2009-12-
14T04:28:00+09:00" destination="ACAP_Data_Server" type="information"
xmlns="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0 PMCP3.0.xsd">
- <AcapDataService action="add">
  <AcapContentId>1000023ddd</AcapContentId>
  - <AcapApplication applicationType="ACAP-J">
    - <Application organizationId="1" applicationId="1" controlCode="AUTOSTART">
      <Name lang="kor">Damo</Name>
      - <ApplicationInfo serviceBound="1" visibility="1" priority="1">
        <Profiles profile="1" versionMajor="1" versionMinor="1" versionMicro="1" />
        <ProtocolLabels protocolLabel="1" />
      </ApplicationInfo>
      - <Prefetch protocolLabel="1">
        <Labels label="Lab1" priority="1" />
      </Prefetch>
      <AcapJApp parameter="ACAP" />
      <AcapJAppLocation baseDirectory="/Damo" classpathExtension=""
        initialClass="XletMain.class" />
    </Application>
  - <!--
  applicationType="6" for ACAP-J
  -->
  <TransportProtocol protocolLabel="1" sourceId="1" componentTag="0" />
  - <!--
  protocolId="6" for ACAP ObjectCarousel
  -->
</AcapApplication>
- <AcapObjectCarousel carouselId="1000">
  - <DataCarousel>
    <Dsi moduleId="0" objectKey="0" associationTag="0" />
    - <!--
    DSI Message for DII1
    -->
    - <Dii Identification="100" blockSize="4066">
      - <!--
      DII 1 for Module 0
      -->
      - <Module moduleId="0" moduleSize="200" associationTag="0">
        <ObjectList objectKey="0" objectId="0" />
        - <!--
        Servicegateway Message
        -->
        <ObjectList objectKey="1" objectId="1" />
        - <!--
        Directory 1 Message
        -->
        <ObjectList objectKey="2" objectId="2" />
        - <!--
        File 1
        -->
        <ObjectList objectKey="3" objectId="3" />
        - <!--
        File 2
        -->
        <ObjectList objectKey="4" objectId="4" />
        - <!--
        File 3
        -->
      </Module>
    </Dii>
  </DataCarousel>
</AcapObjectCarousel>

```

```

    </Module>
  </Dii>
</DataCarousel>
- <ObjectCarousel>
  - <ServiceGateway objectId="0" objectKey="0">
    - <!--
      Servicegateway Message
    -->
    - <Bindings objectId="1" name="Damo" kind="dir">
      - <!--
        Directory 1 Message
      -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="1"
          associationTag="0" identification="100" />
      </Bindings>
    </ServiceGateway>
  - <Directory objectId="1" objectKey="1">
    - <!--
      Directory 1 Message
    -->
    - <Bindings objectId="2" name="XletMain.class" kind="fil" contentSize="1000">
      - <!--
        File 1 Message
      -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="2"
          associationTag="0" identification="100" />
      </Bindings>
    - <Bindings objectId="3" name="Display.class" kind="fil" contentSize="1000">
      - <!--
        File 2 Message
      -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="3"
          associationTag="0" identification="100" />
      </Bindings>
    - <Bindings objectId="4" name="Show.png" kind="fil" contentSize="1000">
      - <!--
        File 3 Message
      -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="4"
          associationTag="0" identification="100" />
      </Bindings>
    </Directory>
  - <File objectId="2" objectKey="2" name="XletMain.class" pathName="/Damo"
    fileId="1000">
    - <!--
      File 1 Message
    -->
      <ContentType contentTypeData="application/java"
        transparencyLabel="Transparent" />
    </File>
  - <File objectId="3" objectKey="3" name="Display.class" pathName="/Damo"
    fileId="2000">
    - <!--
      File 2 Message
    -->
      <ContentType contentTypeData="application/java"
        transparencyLabel="Transparent" />
    </File>
  - <File objectId="4" objectKey="4" name="Show.png" pathName="/Damo" fileId="3000">
    - <!--
      File 3 Message
    -->
      <ContentType contentTypeData="image/png" transparencyLabel="Transparent" />
    </File>
</ObjectCarousel>

```

```

    </AcapObjectCarousel>
  </AcapDataService>
</PmcpMessage>

```

## ACAP\_PsipEvent\_Add.xml

```

<?xml version="1.0" encoding="UTF-8" ?>
- <!--
Sample PMCP file for Damo, Two Directory - add ACAP Event
-->
- <PmcpMessage id="100004" origin="Streaming_Controller" originType="Traffic" dateTime="2009-12-
14T04:28:00+09:00" destination="ACAP_Data_Server" type="information"
xmlns="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="http://www.atsc.org/XMLSchemas/pmcp/2006/3.0 PMCP3.0.xsd">
- <AcapDataService action="add">
  <AcapContentId>1000023ddd</AcapContentId>
  - <AcapApplication applicationType="ACAP-J">
    - <Application organizationId="1" applicationId="1" controlCode="AUTOSTART">
      <Name lang="kor">Damo</Name>
      - <ApplicationInfo serviceBound="1" visibility="1" priority="1">
        <Profiles profile="1" versionMajor="1" versionMinor="1" versionMicro="1" />
        <ProtocolLabels protocolLabel="1" />
      </ApplicationInfo>
      - <Prefetch protocolLabel="1">
        <Labels label="Lab1" priority="1" />
      </Prefetch>
      <AcapJApp parameter="ACAP" />
        <AcapJAppLocation baseDirectory="/Damo" classpathExtension=""
initialClass="XletMain.class" />
      </Application>
    - <!--
applicationType="6" for ACAP-J
-->
    <TransportProtocol protocolLabel="1" sourceId="1" componentTag="0" />
    - <!--
protocolId="6" for ACAP ObjectCarousel
-->
  </AcapApplication>
- <AcapObjectCarousel carouselId="1000">
  - <DataCarousel>
    <Dsi moduleId="0" objectKey="0" associationTag="0" />
    - <!--
DSI Message for DII1
-->
    - <Dii Identification="100" blockSize="4066">
      - <!--
DII 1 for Module 0
-->
      - <Module moduleId="0" moduleSize="200" associationTag="0">
        <ObjectList objectKey="0" objectId="0" />
        - <!--
Servicegateway Message
-->
        <ObjectList objectKey="1" objectId="1" />
        - <!--
Directory 1 Message
-->
        <ObjectList objectKey="2" objectId="2" />
        - <!--
File 1
-->
        <ObjectList objectKey="3" objectId="3" />

```

```

- <!--
  File 2
  -->
  <ObjectList objectKey="4" objectId="4" />
- <!--
  File 3
  -->
</Module>
</Dii>
</DataCarousel>
- <ObjectCarousel>
  - <ServiceGateway objectId="0" objectKey="0">
    - <!--
      Servicegateway Message
      -->
    - <Bindings objectId="1" name="Damo" kind="dir">
      - <!--
        Directory 1 Message
        -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="1"
          associationTag="0" identification="100" />
      </Bindings>
    </ServiceGateway>
  - <Directory objectId="1" objectKey="1">
    - <!--
      Directory 1 Message
      -->
    - <Bindings objectId="2" name="XletMain.class" kind="fil" contentSize="1000">
      - <!--
        File 1 Message
        -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="2"
          associationTag="0" identification="100" />
      </Bindings>
    - <Bindings objectId="3" name="Display.class" kind="fil" contentSize="1000">
      - <!--
        File 2 Message
        -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="3"
          associationTag="0" identification="100" />
      </Bindings>
    - <Bindings objectId="4" name="Show.png" kind="fil" contentSize="1000">
      - <!--
        File 3 Message
        -->
        <BiopProfileBody carouselId="1000" moduleId="0" objectKey="4"
          associationTag="0" identification="100" />
      </Bindings>
    </Directory>
  - <File objectId="2" objectKey="2" name="XletMain.class" pathName="/Damo"
    fileId="1000">
    - <!--
      File 1 Message
      -->
      <ContentType contentTypeData="application/java"
        transparencyLabel="Transparent" />
    </File>
  - <File objectId="3" objectKey="3" name="Display.class" pathName="/Damo"
    fileId="2000">
    - <!--
      File 2 Message
      -->
      <ContentType contentTypeData="application/java"
        transparencyLabel="Transparent" />
    </File>

```

```
- <File objectId="4" objectKey="4" name="Show.png" pathName="/Damo" fileId="3000">
- <!--
  File 3 Message
-->
  <ContentType contentTypeData="image/png" transparencyLabel="Transparent" />
</File>
</ObjectCarousel>
</AcapObjectCarousel>
</AcapDataService>
</PmcpMessage>
```

## Annex C: PSIP Metadata System Architecture (informative)

### 1. SYSTEM COMPONENTS

Figure C.1 shows a generic digital television system related to the production of PSIP, with interconnections showing various categories of metadata/data. Note that the blocks relate to the functions of the different devices and subsystems involved and do not necessarily indicate specific items of equipment. The level of implementation of these functional blocks will vary from station to station and in some cases may be absent or only partially implemented.

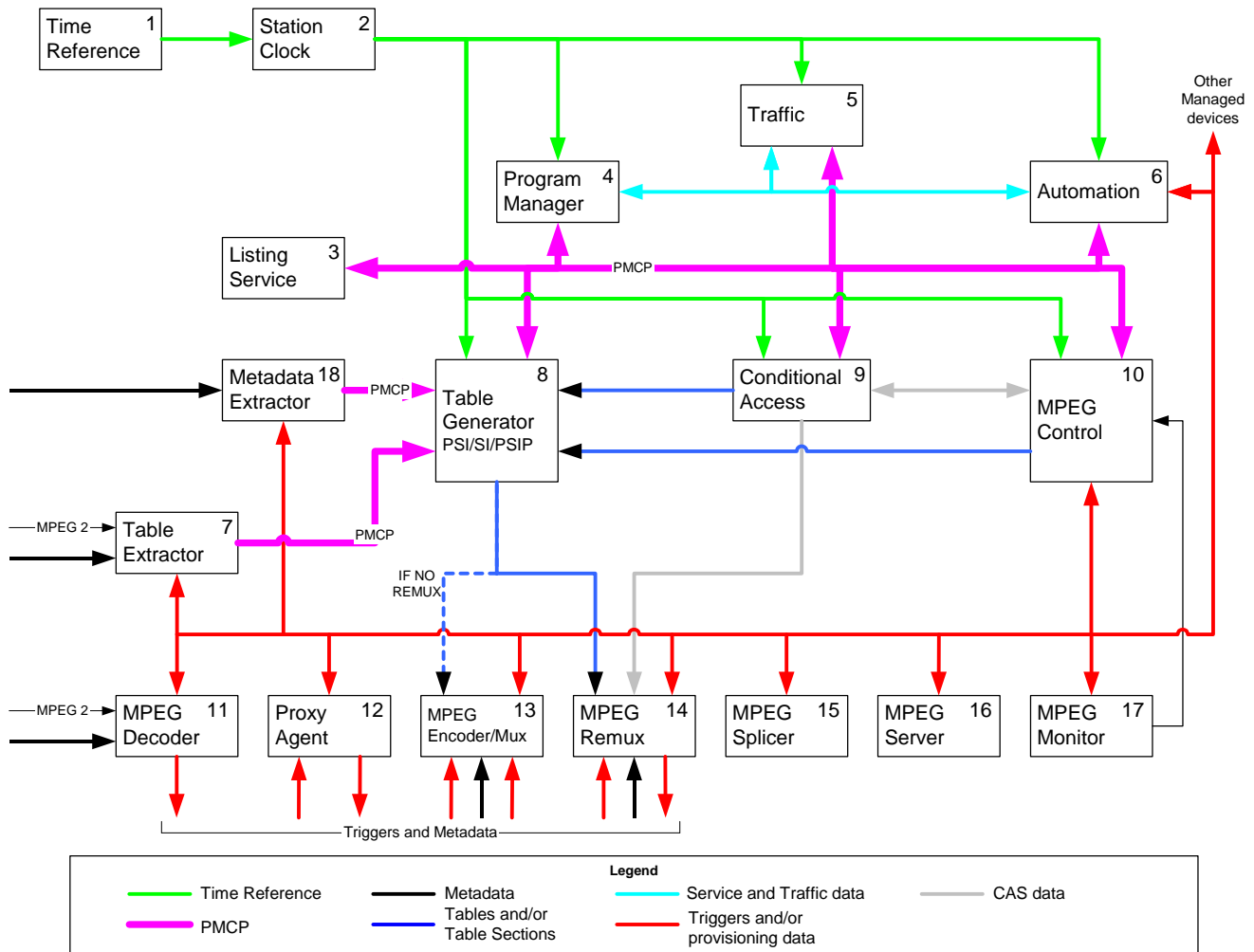


Figure C1 PSIP metadata system.

The blocks in Figure C.1 have the following functions:

1. Time Reference      A source of accurate time signals, usually referenced directly or indirectly to UTC.

2. **Station Clock** A device that generates and/or distributes time signals to devices and systems within the station. May include a highly stable internal clock that is updated on a regular basis from an external standard reference such as GPS or the US Naval Observatory. Typically provides local time at the station, referenced to UTC. Outputs SMPTE time code and/or NTP (network time protocol) and/or proprietary time clock signals. May be combined with a video sync generator.
3. **Listing Service** A third-party service using a database where program information is collected and compiled into programming data, for delivery to broadcasters and to other media for program guide publication.
4. **Program Manager** A management and planning system, including a database of program elements, used to produce the broadcast schedule to be carried over one or more channels.
5. **Traffic** A management system comprising a database for tracking the sale of advertising and the scheduling of advertising, promotional announcements, program elements, and other interstitial material.
6. **Automation System** A management and control system comprising a database of schedule information used for triggering multiple devices with precision timing, for frame or near frame accurate operation of a broadcast system.
7. **Table Extractor** A bridge device that monitors a transport stream for the presence of PIDs carrying tables, and parses the table data for use by other devices.
8. **Table Generator** Also referred to as the PSIP Generator. A server device that creates defined system information table structures, including PSIP, associated with a multiplex of programs, that are inserted into a transport stream for play out in the multiplex.
9. **Conditional Access** A component or collection of components used for encrypting a PID, a program event, a channel or collection of channels, or any combination of the above, in order to restrict access to the material to certain authorized groups of users only.
10. **MPEG Control** A manager, control system, or set of controls used to manipulate the configuration and operation of any of the components of an MPEG system. May control device parameters directly or enable, modify or delete profiles used to operate the equipment, and manage redundancy and log errors.
11. **MPEG Decoder** A device that transforms a compressed MPEG-encoded bitstream into an analog or uncompressed digital video or audio signal.
12. **Proxy Agent**
  - 1) A device (usually a computer) that bridges between two protocols so that incompatible interface messages can be passed from one domain to another.
  - 2) A device used for protocol translations for extending signal reach beyond network limitations.

13.	MPEG Encoder	A transformation device used to convert a video, audio or raw data signal into a compressed bitstream of packetized data (packetized elementary stream or PES) carried as a multiplex of PIDs over a transport stream in real time.
14.	MPEG Remultiplexer	A device capable in real time of disassembling and re-assembling packet streams from one or more MPEG-2 transport stream inputs into one or more transport stream outputs containing a multiplex of packets.
15.	MPEG Splicer	A real time device that allows switching between compressed bitstreams, providing seamless or near-seamless program transitions triggered from commands either in the transport stream or from an external control system.
16.	MPEG Server	A disk-based storage device that stores content in the MPEG domain.
17.	MPEG Monitor	A device that monitors the attributes of a compressed bitstream and that may log and report out-of-limit parameters and occurrences.
18.	Metadata Extractor	A device that extracts metadata transported with an associated video or audio signal and forwards it for use by other devices

## 2. PMCP DATA FLOW

Programming metadata flow between devices and systems will vary depending on the requirements of the broadcaster, the number and type of program and traffic support services used, and the degree of automation implemented. Arrangements are described below for one possible flow of information using PMCP. Not all broadcasters will implement all functions mentioned. Time periods mentioned for metadata transfer may change in the future since it is possible that the use of PMCP and other new technological advances will change operational practices.

### 2.1 Program Planning and Listing Service

Long-term program planning and scheduling may take place in the Program Manager (4). This system may take input from station staff and also from the network that the station belongs to (if any). A draft television schedule, usually covering many weeks or months for the television station output channel(s), is typically sent monthly using PMCP to the Listing Service (3) and to Traffic (5) (updates may be sent more frequently). The listing service may add detailed information about the particular shows, including actual durations, titles and content details, and then may send a revised schedule back to the station using PMCP. The Listing Service may also distribute program schedules to other news media for publication. For schedules sent to the station, a 16-day rolling schedule may be used, with daily or more frequent downloads.

### 2.2 Traffic, PSIP Generator, and Automation

At the station the schedule with program information may be received by Traffic and the PSIP Table Generator (8), and may also be fed back to program management. The PSIP Generator may use the information from the Listing Service to populate much of the PSIP table information. Meanwhile Traffic establishes the detailed daily schedule and on-air playlist, taking



account of network and local programming, advertisements, promotional and other interstitial material. One or more Alternate Schedules may also be created to cater for different operational scenarios, live program over-runs, emergencies, etc. The detailed playlist, typically covering one day (often more at weekends and holidays) is distributed from Traffic to Automation (6), usually one to three days before the airdate, and an associated schedule with PSIP events is sent from Traffic to the PSIP Generator using PMCP.

Once control of the schedule has been handed over to Automation, any changes to the schedule may be communicated from Automation to the PSIP Generator using PMCP. It should be noted that the Traffic and Automation system databases may not hold all the detailed show content information downloaded from the listing service to the PSIP generator, so updates about the schedule sent from Traffic or Automation to the PSIP Generator may update PSIP event times, durations and other information, while leaving other show details already entered into the PSIP tables intact.

### **2.3 Other Sources of PSIP Information**

Where the Network generates PSIP information for network programs, this can be distributed to the station along with a program in an MPEG bitstream. The metadata may be extracted using the Table Extractor (7) and fed to the PSIP generator using PMCP.

Some PSIP information associated with a show (e.g., caption service information, parental advisory, AC-3 audio, broadcast flag) can be carried in data packets inserted into the baseband video or audio streams. This metadata may be extracted using the Metadata Extractor (18) and fed to the PSIP generator using PMCP to update the appropriate current channel parameters.

Some PSIP information can be generated by particular hardware associated with the MPEG encoding and distribution process, and may not be known to upstream planning systems, or may over-ride previously entered values (e.g. audio stereo or surround sound mode). This metadata may be sent by MPEG Control (10) and fed to the PSIP Generator using PMCP to update the appropriate current channel parameters.

### **2.4 Last-Minute Schedule Changes**

Automation controls the on-air program switching of the station output in real-time. If last-minute changes to the schedule are required, this may take place in Traffic, in which case a new play list is produced and equivalent schedule updates are sent to the PSIP Generator. If the schedule changes are made in Automation, with manual intervention from the master control operator, then Automation may send updates for particular events to the PSIP Generator using PMCP.

If a decision is taken to switch to an alternate schedule, then new schedule information is sent to the PSIP Generator. This could be in the form of updates from automation, or as a new schedule download from traffic to the PSIP generator.

## **3. STATION TIMING**

An accurate time reference is required for a station to broadcast programs to a published schedule, synchronized with program contributions from a network or other sources, and including accurate PSIP time information. Use of the following techniques will help ensure that

automation control and on-air switching can be carried out with frame accuracy, and that PSIP time accuracy will meet the +/- 1 second requirement of A/65B.

### **3.1 Time Reference**

The automation system and any other time-sensitive systems and equipment affecting on-air operations should be locked to a feed of SMPTE time code or other timing signal from a station master clock system. The PSIP table generator and other computer-based systems should be locked to the station master clock or to a source of the same standard time distributed through the local area network. Depending on broadcast operational requirements, the time used by the station may be local time or UTC (sometimes informally referred to as GMT – Greenwich Mean Time, now an obsolete term).

The accuracy of the station clock should be maintained with a standard external reference. Several methods exist including radio broadcast signals, telephone dial-up, Internet access and GPS. Whichever way the time signal is received, to maintain a uniform time system the ultimate time reference should be a national laboratory source of UTC (in the US this is the US Naval Observatory in Washington DC).

Systems and equipment external to the station that send signals and information affecting current operations in real time should also be referenced directly or indirectly to UTC.

Systems such as the traffic system, program management system, and program listing service, typically process program schedule and timing information in non-real time and off line from the on-air broadcast chain. It is noted that timing reference accuracy for these systems may therefore be less stringent than for on-air devices. However, if such systems may on occasions be required to send PSIP information or other metadata for current on-air program events, then they should use the same ultimate timing reference and have the same timing accuracy as the PSIP generator.

### **3.2 GPS Time**

GPS time is defined as the number of seconds elapsed since 0000 Universal Time on January 6, 1980. It is offset from UTC by an integer number of seconds (currently 13) due to leap seconds added to UTC but not to GPS time. The time offset is distributed with the GPS signal, so any station clock or other device that is referenced to GPS is locked to UTC and is aware of actual UTC time.

## **4. ASSUMPTIONS**

The following assumptions apply to equipment and systems designed for use with PMCP:

- a) Metadata for a given program element in the transport stream may arrive at multiple locations and multiple times.
- b) The actual broadcast time, duration and/or content of a PSIP event may change and the associated metadata may need to be updated.
- c) When a change occurs in the transport stream it is acceptable that updates to affected system information and PSIP tables may miss the first instance of transmission of the table after the transport stream change occurs. Therefore equipment that makes a change in one or more characteristics of the transport stream may report the changes to other affected equipment

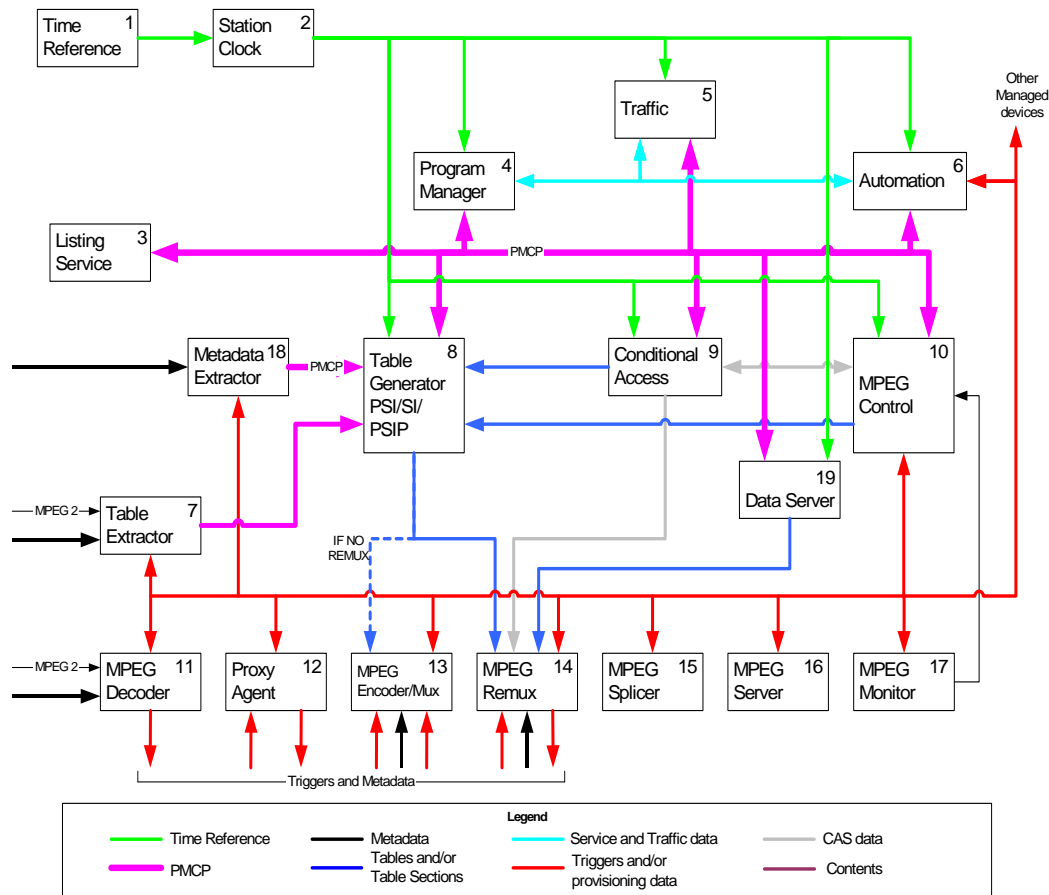
immediately after the change is made. This does not preclude advance notice for tables that send advance information.

- d) Automation, Traffic, and some other systems may handle program segments at a more detailed level than used for PSIP events. Only information about the primary automation event that coincides with the start of the PSIP event (as determined by station policy) will be communicated from these systems to other equipment and systems as the PSIP event. Primary and secondary automation events at other times may affect the configuration of the transmitted bitstream and such information may be communicated as channel information updates at any time.

## Annex D: PMCP with Data Broadcasting for ACAP (Informative)

### 1. SYSTEM COMPONENTS

Figure D1 shows a generic digital television system related to the production of PSIP, with interconnections showing various categories of metadata and the addition of a data server. Note that the blocks relate to the functions of the different devices and subsystems involved and do not necessarily indicate specific items of equipment. The level of implementation of these functional blocks will vary from station to station and in some cases may be absent or only partially implemented.



**Figure D1** PSIP metadata system with ACAP.

The blocks in Figure D1 have the following functions (numbers 1 through 18 are the same as in Figure C1 and repeated here for convenience, with the addition of the description of the new block):

1. Time Reference      A source of accurate time signals, usually referenced directly or indirectly to UTC.

2. **Station Clock** A device that generates and/or distributes time signals to devices and systems within the station. May include a highly stable internal clock that is updated on a regular basis from an external standard reference such as GPS or the US Naval Observatory. Typically provides local time at the station, referenced to UTC. Outputs SMPTE time code and/or NTP (network time protocol) and/or proprietary time clock signals. May be combined with a video sync generator.
3. **Listing Service** A third-party service using a database where program information is collected and compiled into programming data, for delivery to broadcasters and to other media for program guide publication.
4. **Program Manager** A management and planning system, including a database of program elements, used to produce the broadcast schedule to be carried over one or more channels.
5. **Traffic** A management system comprising a database for tracking the sale of advertising and the scheduling of advertising, promotional announcements, program elements, and other interstitial material.
6. **Automation System** A management and control system comprising a database of schedule information used for triggering multiple devices with precision timing, for frame or near frame accurate operation of a broadcast system.
7. **Table Extractor** A bridge device that monitors a transport stream for the presence of PIDs carrying tables, and parses the table data for use by other devices.
8. **Table Generator** Also referred to as the PSIP Generator. A server device that creates defined system information table structures, including PSIP, associated with a multiplex of programs, that are inserted into a transport stream for play out in the multiplex.
9. **Conditional Access** A component or collection of components used for encrypting a PID, a program event, a channel or collection of channels, or any combination of the above, in order to restrict access to the material to certain authorized groups of users only.
10. **MPEG Control** A manager, control system, or set of controls used to manipulate the configuration and operation of any of the components of an MPEG system. May control device parameters directly or enable, modify or delete profiles used to operate the equipment, and manage redundancy and log errors.
11. **MPEG Decoder** A device that transforms a compressed MPEG-encoded bitstream into an analog or uncompressed digital video or audio signal.
12. **Proxy Agent**
  - 1) A device (usually a computer) that bridges between two protocols so that incompatible interface messages can be passed from one domain to another.
  - 2) A device used for protocol translations for extending signal reach beyond network limitations.

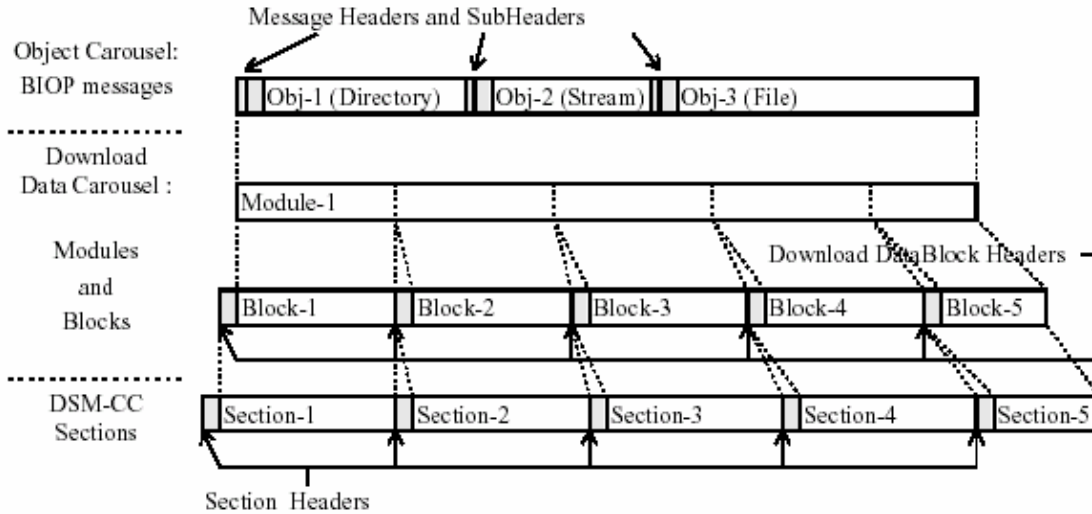
- 
13. MPEG Encoder A transformation device used to convert a video, audio or raw data signal into a compressed bitstream of packetized data (packetized elementary stream or PES) carried as a multiplex of PIDs over a transport stream in real time.
  14. MPEG Remultiplexer A device capable in real time of disassembling and re-assembling packet streams from one or more MPEG-2 transport stream inputs into one or more transport stream outputs containing a multiplex of packets.
  15. MPEG Splicer A real time device that allows switching between compressed bitstreams, providing seamless or near-seamless program transitions triggered from commands either in the transport stream or from an external control system.
  16. MPEG Server A disk-based storage device that stores content in the MPEG domain.
  17. MPEG Monitor A device that monitors the attributes of a compressed bitstream and that may log and report out-of-limit parameters and occurrences.
  18. Metadata Extractor A device that extracts metadata transported with an associated video or audio signal and forwards it for use by other devices
  19. Data Server A device that provides, encapsulates, and transmits data content, announcement and binding information.

The ATSC PMCP schema[PMCP] was extended to the interface message for data broadcasting by specifying the new elements for encapsulation, signaling and announcement. The PMCP extension schema for data broadcasting is backward compatible with the PMCP schema so that conventional emission station based on PMCP schema can be easily implemented for data broadcasting emission system in the future.

With regard to the encapsulation and signaling protocol, the transport standards defined how to send the object carousel of [ACAP]. ATSC also specified signaling and announcement of ACAP in CS-TSG-676. Therefore, PMCP extension schema for data broadcasting provides the data needed by CS-TSG-676. This document considers only ACAP data broadcasting in defining the extension schema for encapsulation and signaling of ACAP using the DET and the EIT for announcement in terrestrial data broadcasting.

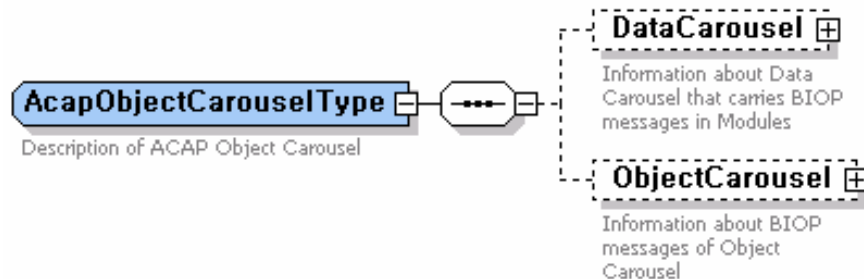
## **2. THE PMCP SCHEMA EXTENDED FOR ACAP ENCAPSULATION**

The data and attributes of one U-U object in an object carousel are transmitted in one message. The message format is specified by the BIOP(Broadcast Inter ORB Protocol) and is referred to as the BIOP Generic Object Message format. BIOP Messages are carried in Modules of Data Carousels[DSMCC]. A module is composed of the one or more BIOP Message. Each object in the module is identified by the objectkey. According to the DSM-CC data carousel specification, each module is fragmented into one or more Blocks which are carried in a DownloadDataBlock message as shown in Figure D2.



**Figure D2** Encapsulation and fragmentation of BIOP messages.

Figure D3 shows the AcapObjectCarouselType to describe the encapsulation information of object carousel defined in ACAP standard[ACAP]. The AcapObjectCarouselType is divided into two children element : “DataCarousel” element and “ObjectCarousel” element. “DataCarousel” element represents the information of data carousel that delivers the BIOP messages in modules, and the “ObjectCarousel” element contains the information of BIOP messages of the object carousel.



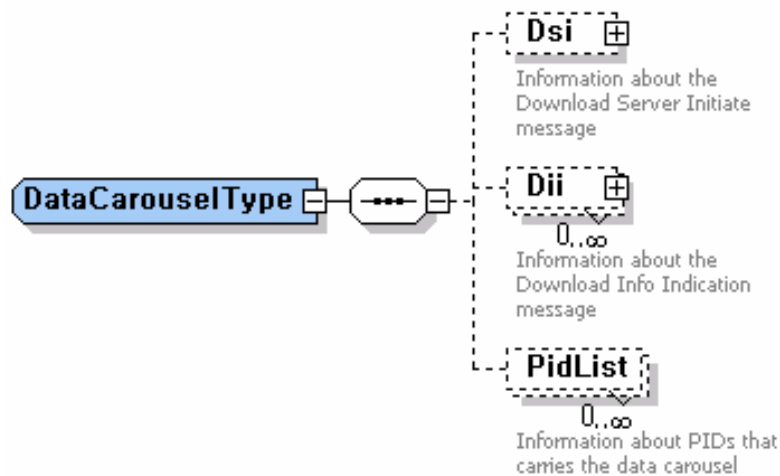
**Figure D3** ACAP Object Carousel Type diagram.

### 3. DATA CAROUSEL TYPE

The BIOP message is carried through the data carousel. Data carousel consists of DownloadServerInitiate messages, DownloadInfoIndication message and DownloadDataBlock message. These data carousel messages are explained as the following.

- DownloadServerInitiate(DSI) is a message to provide the reference of service gateway(i.e. root directory) of the object carousel
- DownloadInfoIndication(DII) is a message to describe a set of modules such as module’s location, version and size
- DownloadDataBlock(DDB) is a message to carry BIOP messages with its payload

DataCarouselType is composed of three elements: the “Dsi” element (DSI), the “Dii” element (DII) and the “PidList” element to describe the above the DSI, DII and PIDs as shown in Figure D4. The lowercase form is used in the schema to comply with the schema naming convention. One “Dsi” element and more than one “Dii” element are defined in a DataCarouselType because the two-layer data carousel for ACAP object carousel is initiated to one DSI message and more than one DII message. The “PidList” element in DataCarouselType describes the condition that DII message may be delivered by means of several modules with different PIDs. Each child element in DataCarouselType can be identified and combined with association\_tag that is defined with the required attribute in “Dsi” element, “Dii” element and “PidList” element.



**Figure D4** Data Carousel Type diagram.

#### 4. OBJECT CAROUSEL TYPE

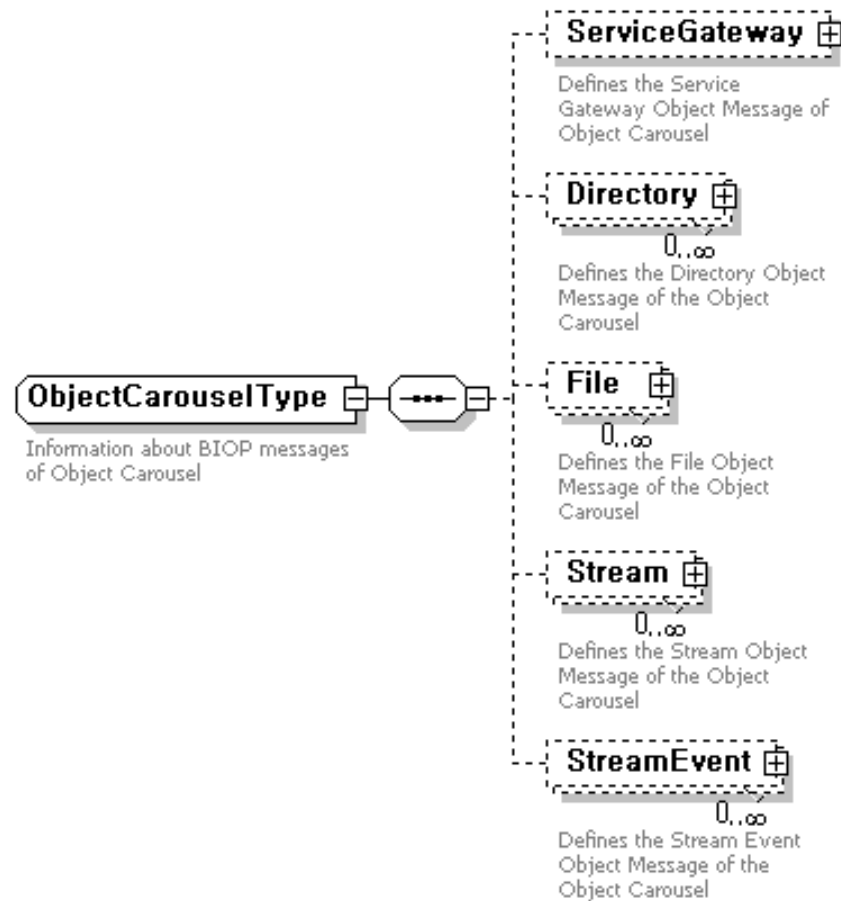
The ObjectCarouselType defines the BIOP messages of the object carousel as illustrated in Figure D5. The ObjectCarouselType includes the children elements to describe the following BIOP messages.

- Service Gateway Message  
The service gateway message references the root directory of the file system delivered by an object carousel.
- Directory Message  
The directory message represents the sub directory of the file system to be transported by object carousel.
- File Message  
The file message is used to convey the data of file and describes the information such as the location and contents type of files.
- Stream Message  
The stream message describes the list and references to the streams in the broadcast network.



- Stream Event Message

The stream event message contains the list and references to stream events in the broadcast network



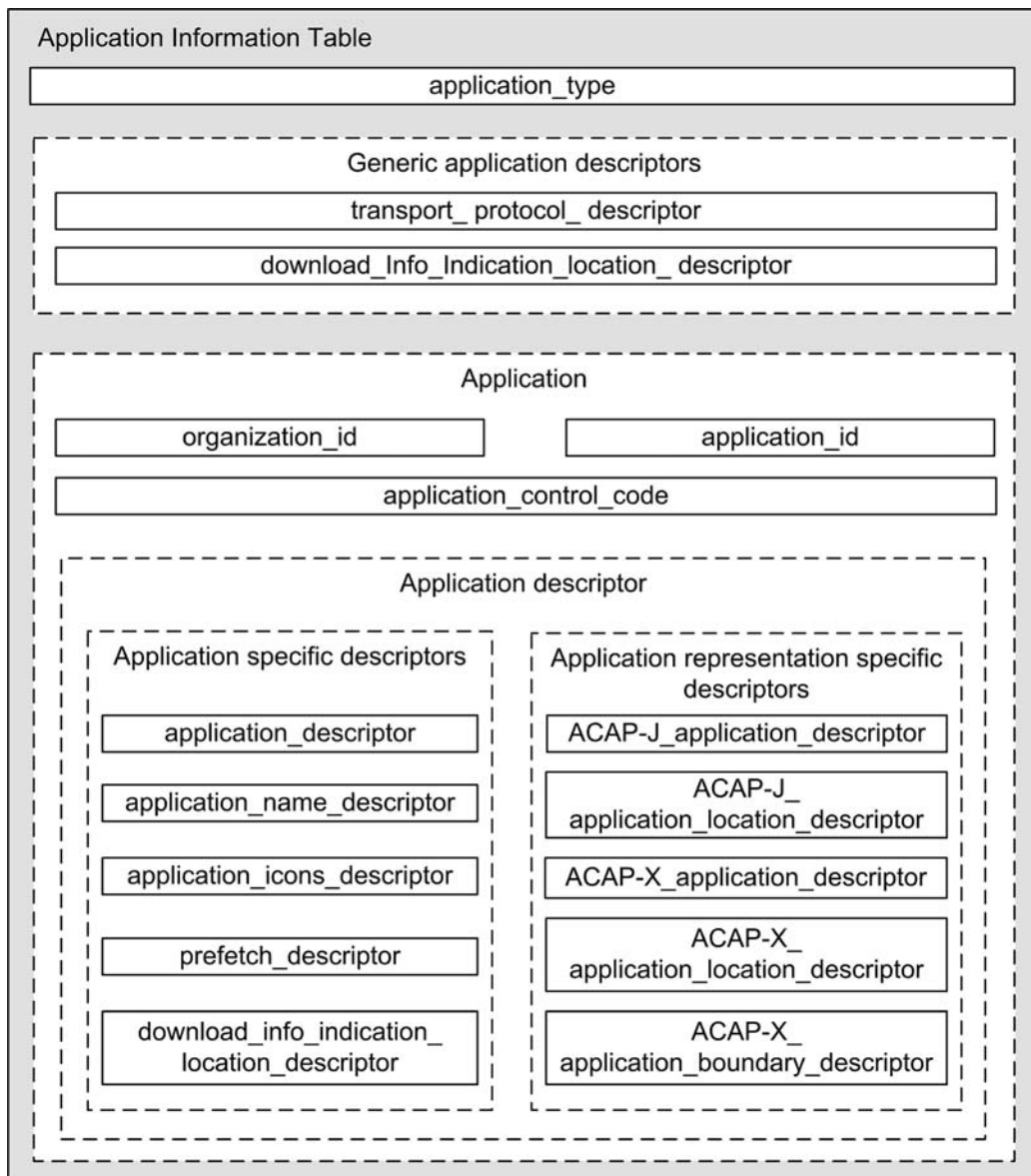
**Figure D5** Object Carousel Type diagram.

## 5. THE PMCP SCHEMA EXTENDED FOR ACAP SIGNALING

The signaling information enables receivers not only to identify applications associated with a service and their location from which to recover them. The ACAP standard specifies PMT(Program Map Table) and AIT(Application Information Table) to signal data application into receiver. The PMCP extension schema for data broadcasting, therefore, includes the elements to describe the information relating to both AIT and PMT.

### 5.1 ACAP Application Type for AIT signaling

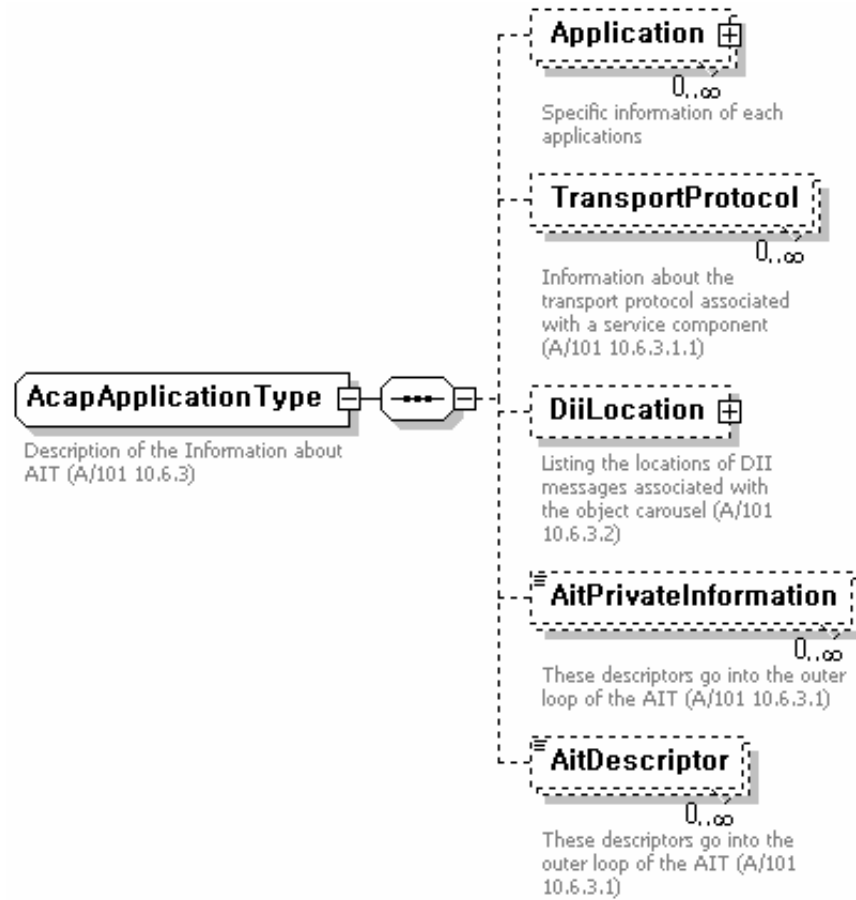
The Application Information Table describes applications and their associated information. Each Application Information Table includes one “common” descriptor loop at the top level for descriptors that are shared between application of that sub table and a loop of application. Each application identified in the application loop has an application descriptor loop containing the descriptors associated with that application. Figure D6 illustrates the syntax structure of AIT defined in [ACAP].



**Figure D6** Representation of the contents of the AIT.

Descriptors of AIT are categorized into three parts: generic application descriptor, application specific descriptor and application representation specific descriptor. Generic application descriptors are included in common descriptor loop. The application specific descriptors also are specific to the application instance. Application representation specific descriptors are specific not only to application instance but also to application representation.

The AIT and descriptors mentioned above are represented by the schema shown in Figure D7.



**Figure D7** ACAP Application Type diagram.

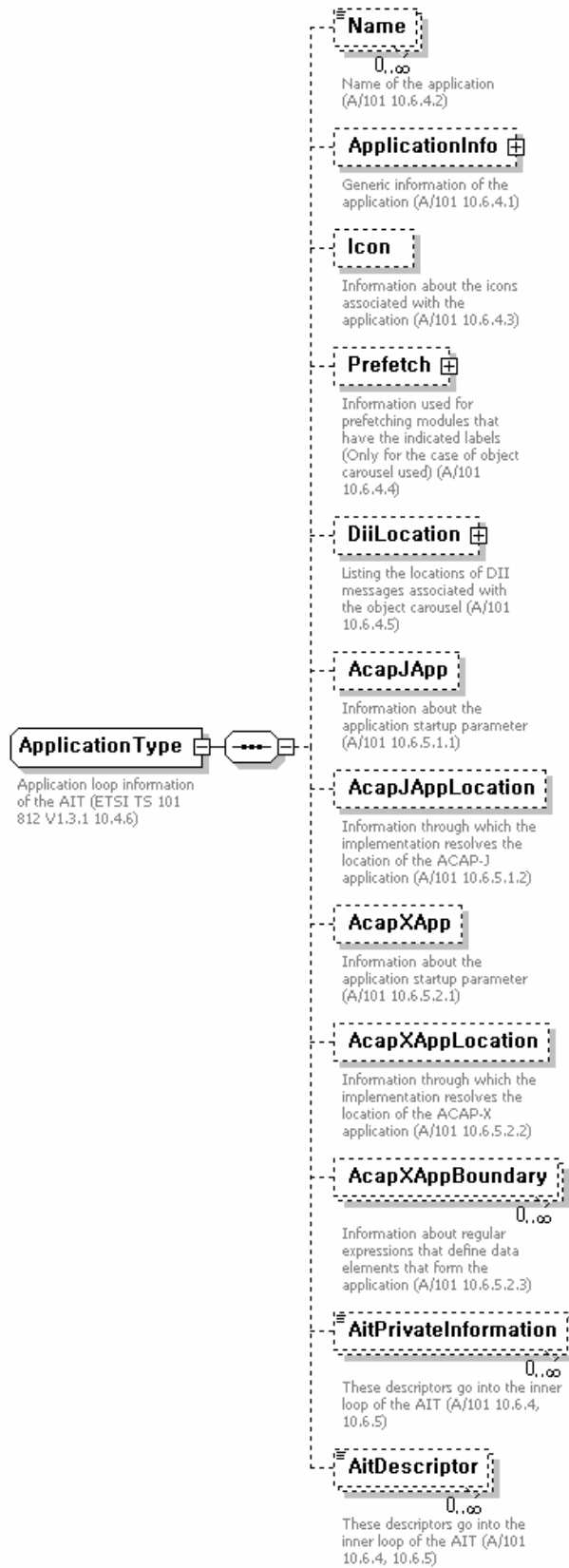
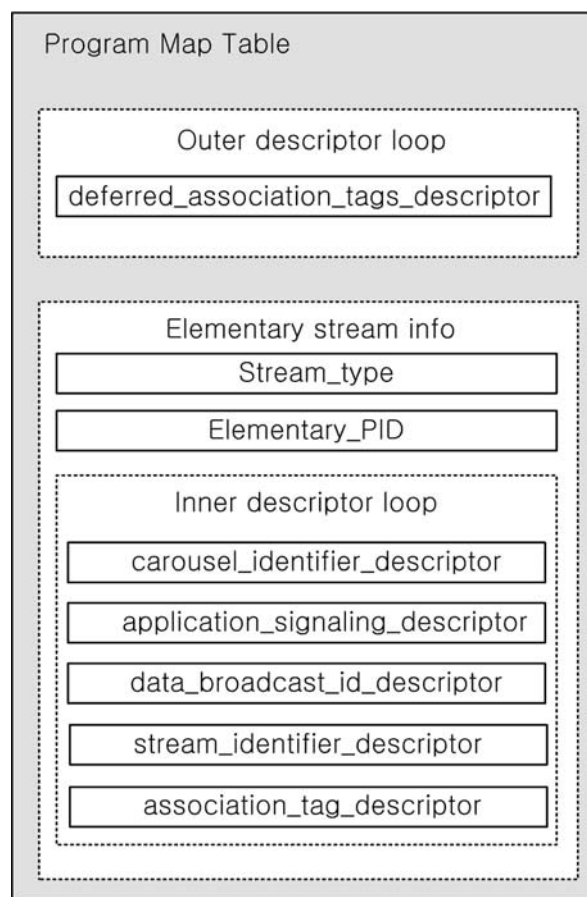


Figure D8 Application Type diagram.

The TransportProtocol and the DiiLocation describes the information of transport\_protocol\_descriptor and download\_info\_indication\_descriptor respectively. The Application element attributes include organizationId, applicationId and controlCode and also includes the elements to describe the information of application descriptors of AIT as shown in Figure D8.

## 5.2 Channel Type for PMT signaling

In order to describe the elementary streams of the object carousel, the PMCP schema extended for ACAP data broadcasting includes the additional several elements to describe PMT descriptors. Figure D9 represents the several PMT descriptors relating to data broadcasting. The first loop for PMT descriptor delivers deferred\_association\_tags\_descriptor; the second loop for PMT descriptor consists of carousel\_identifier\_descriptor, application\_signaling\_descriptor, data\_broadcast\_id\_descriptor, stream\_identifier\_descriptor, and association\_tag\_descriptor.



**Figure D9** Representation of the contents of the PMT for ACAP data broadcasting.

Figure D10 illustrates the schema of PMT descriptors for the object carousel. New elements, which describe PMT descriptors for data broadcasting, can be added into ElementaryStream element of the ChannelType defined in PMCP because ElementaryStream element plays a role in describing the information of the second loop descriptors for the PMT.

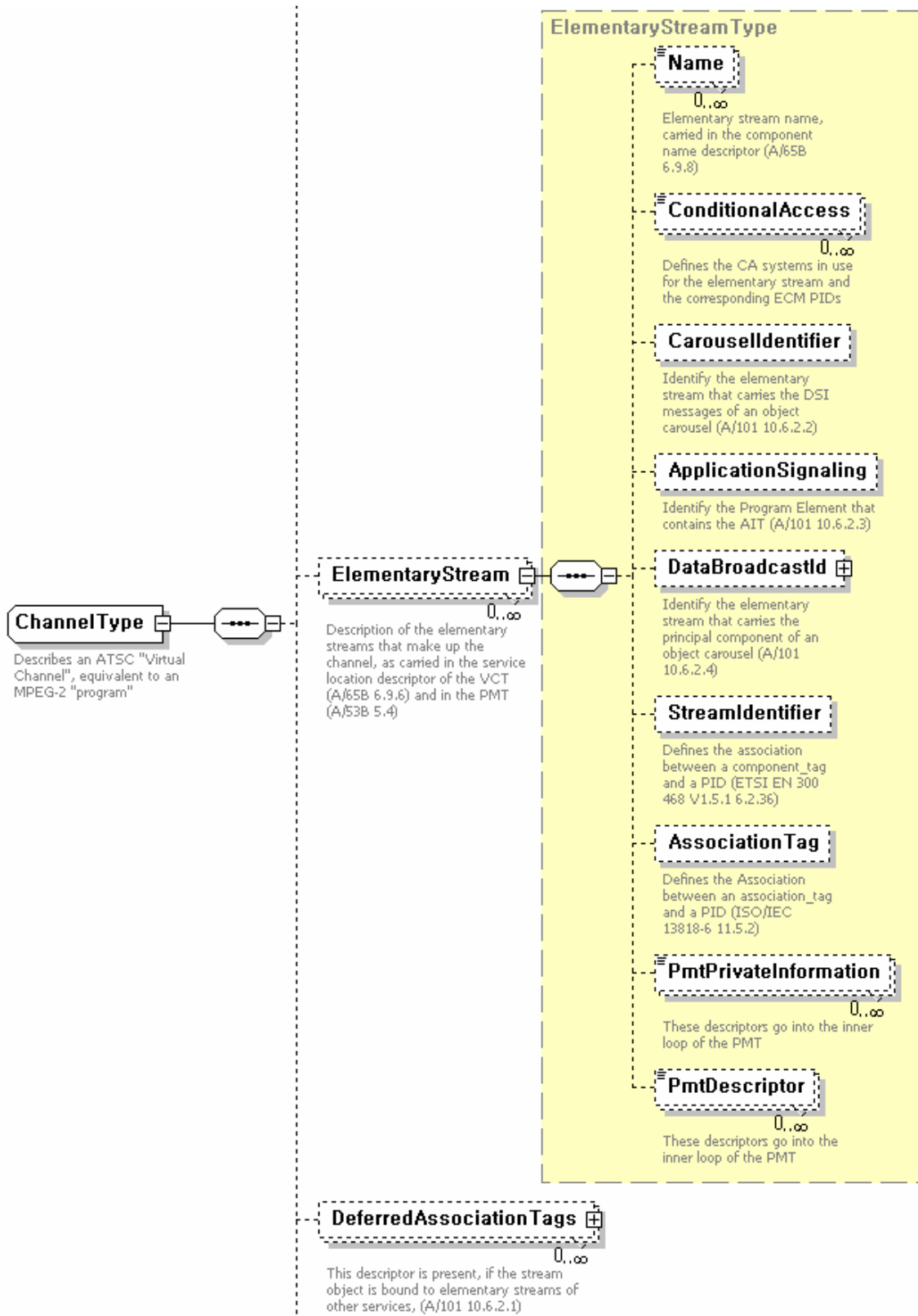
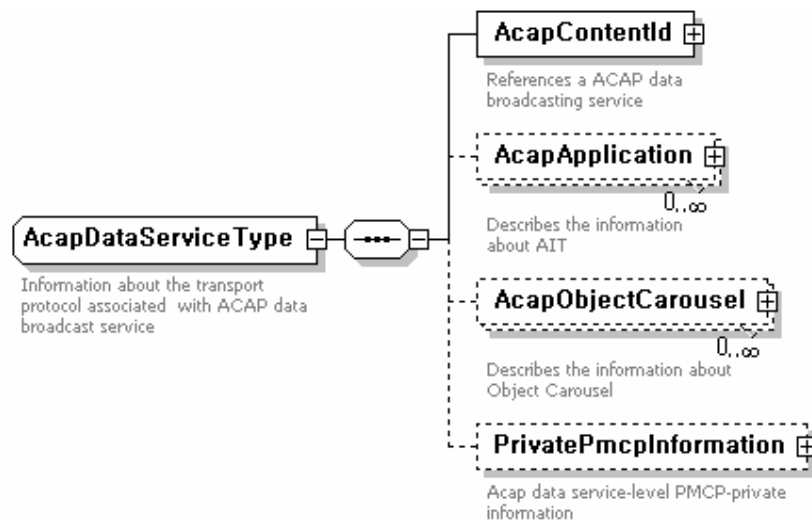


Figure D10 Channel Type diagram for the PMT descriptor.

### 5.3 ACAP Encapsulation and AIT Signaling

Figure D11 illustrates the `AcapDataServiceType` structure which defines the encapsulation and the AIT signaling for data broadcasting. The `AcapDataServiceType` is composed of the `ContentId` element, `AcapApplication` element, `AcapObjectCarousel` element and the optional `PrivatePmcpInformation` element. The `ContentId` element provides the linkage between `AcapDataServiceType` and `PsipEventType`, or `AcapDataService` and `PsipDataEventType`. The linkage enables ACAP transport stream to obtain the schedule information from `PsipEventType` or `PsipDataEventType` that describes start time and duration with its attributes. Both the `AcapObjectCarousel` element in Section D.2 and the ACAP Application element in Section D.5.1 describe the encapsulation and the signaling information defined in ACAP.



**Figure D11** ACAP Data Service Type diagram.

## 6. PMCP SCHEMA EXTENDED FOR DATA BROADCASTING

The extended PMCP schema for data broadcasting has newly defined `PsipDataEvent` element for ACAP announcement in Section 5.9.6 and `AcapDataService` element for ACAP encapsulation and AIT signaling in Section D.5. In addition, it describes the Channel element modification for PMT signaling specific to ACAP in Section D.5.2. The `AcapDataService` element consists of three elements such as `ContentId`, `AcapObjectCarousel` and `AcapApplication`. Both the `AcapObjectCarousel` and the `AcapApplication` are combined with an `AcapDataService` element in that an ACAP data broadcast service is provided with the AIT and the object carousel delivers applications and their signaling information, respectively. The `AcapDataService` element contains `ContentId` element defined in the `PsipEvent` or the `PsipDataEvent` in the PMCP schema to associate an ACAP transport stream with an event. The `ContentId` element enables the `AcapDataService` element to identify the schedule information defined in the `PsipEvent` element or the `PsipDataEvent` element. The schedule information is used in controlling the delivery of the transport stream for the ACAP data service.

The overall structure showing the previously described elements is shown in Figure D12.

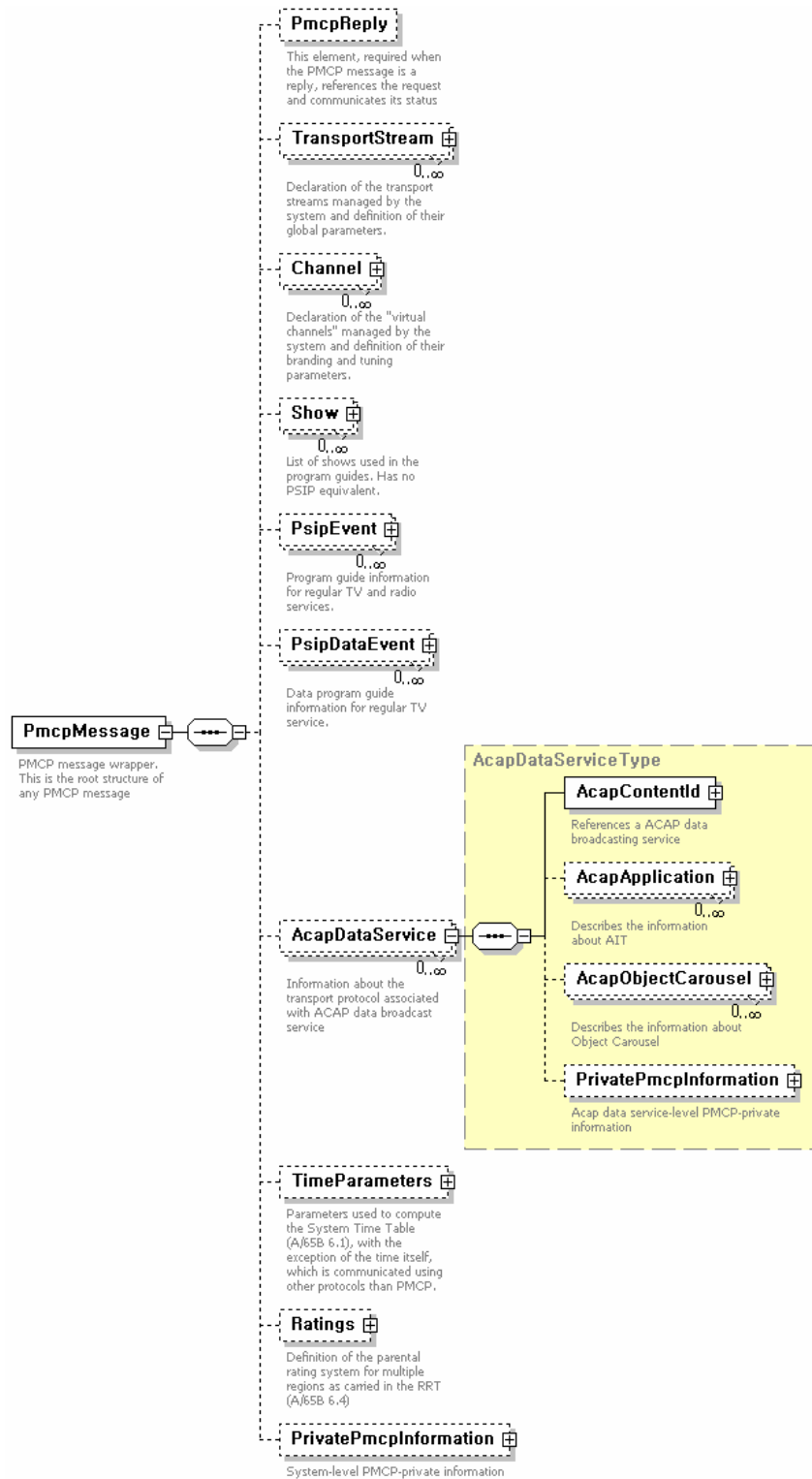


Figure D12 The Extended PMCP Schema diagram.



## **Annex E: List of Electronic Files**

The following electronic files are available from ATSC: see <http://www.atsc.org/standards.html>.

### **PMCP Schema**

- PMCP2.2.xsd

### **PMCP Use Cases**

- AudioInformationNext.xml
- AudioInformationStart.xml
- AudioInformationStop.xml
- Captions.xml
- DurationChange.xml
- ErrorMessage.xml
- EventNameChange.xml
- EventShift.xml
- HeartbeatReply.xml
- HeartbeatRequest.xml
- PrivateInformation.xml
- ScheduleDownload.xml
- ScheduleRead.xml
- ShowNameChange.xml