SMPTE ENGINEERING GUIDELINE

Broadcast Exchange Format (BXF) — Schema Documentation

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(*) Indicates XSD's with significant changes to be reviewed.

Foreword

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

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative practices. SMPTE Standard 2021-4 was prepared by Technology Committee 34CS.

Intellectual Property

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

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document

Broadcast Exchange Format (BXF) is a protocol for exchange of data among broadcast systems such as Traffic, Program Management, Automation, and Content Distribution. It is intended to facilitate the movement of content and its associated metadata for better management, coordination and reporting between these broadcast systems. The BXF Protocol serves as a replacement for the many proprietary interfaces in place today between vendors in these areas.

Unless otherwise specified the order of precedence of the types of normative information in this document shall be as follows. Normative prose shall be the authoritative definition. Tables shall be next, followed by formal languages, then figures, and then any other language forms. In the event of a conflict between the schema and other information in this document, the schema is authoritative.

SMPTE 2021 (BXF) is now broken into several parts. A brief outline of the parts can be found in SMPTE 2021-0, the Document Roadmap to this suite of documents.

As of BXF 3.0, many schema changes have taken place. Those changes are described under the appropriate schema sections in this document.

1. Scope

This EG focuses on documentation of the BXF schemas.

2. Conformance Notation

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

All text in a Standard, Recommended Practice, Amendment, Addendum, or Corrigendum, is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

Normative references are external documents referenced in normative text that are indispensable to the user. Bibliographic references are references made in informative text or are those otherwise not indispensable to the user. Normative references shall conform to the types and procedures specified in the Engineering Administrative Practices.

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted. The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

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

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

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

3. Description of BXF Schema

This documentation does not contain the actual schema, but instead provides a reference to the individual files that can be viewed with any number of tools, including easily accessible browsers such as Microsft’s Windows® Internet Explorer®, Apple’s Safari, and other third party tools. In addition to the XML Schema Files (.XSD) the user can also browse the schema using the .html files.

Depending on the tools you use, different parts of the schema could appear in different formatting. The section below describes the meaning of various parts of the schema as you would see them in the .html version.

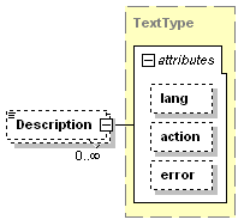
4. Schema Documention

A number of graphics and symbols are used in the documentation to help describe the various elements of the schema and how the elements are related. These represent components and the relationships between schema components. The different components are represented by the following:

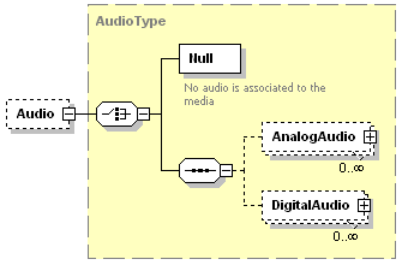
Single element – mandatory: Indicated by a rectangle with a solid border. The element name is inside the shape.

Single element – optional: Indicated by a rectangle with a dashed border. The element name is inside the shape.

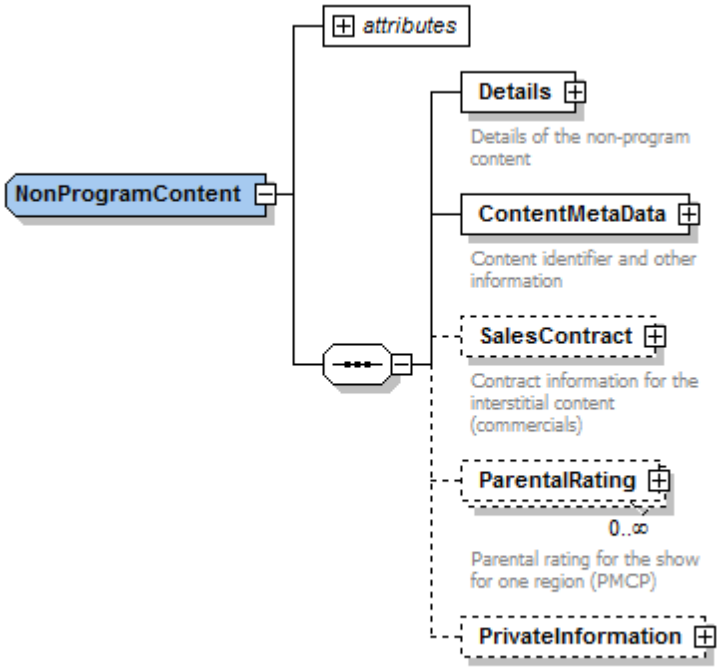
Multiple elements: Indicated by a rectangle with a solid border with a number range representing the minimum and maximum number of occurrences possible. In the example, 0 to infinity (0..∞) is shown.



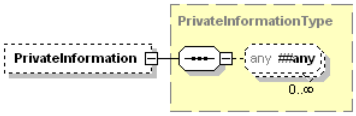
Elements containing child elements: Indicated by a [+] or [-] on the element, representing an element containing additional attributes or elements. The [+] indicates that additional elements are available for display. The [-] indicates that the child elements are displayed.



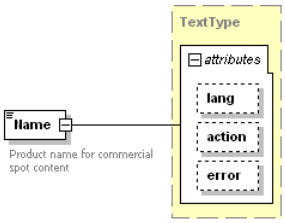
Complex type: Indicated by a partial hexagon and a child element symbol.



Wildcards: Indicated by an octagon with any at the left.

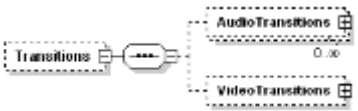


Attributes: Indicated by the word ‘attributes’

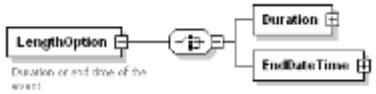


The relationships between components are represented by symbols for sequence and choice.

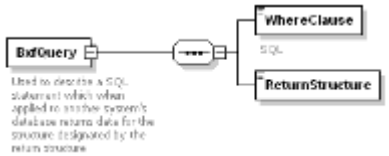
Sequence: The sequence compositor shows that all elements occur in sequence.



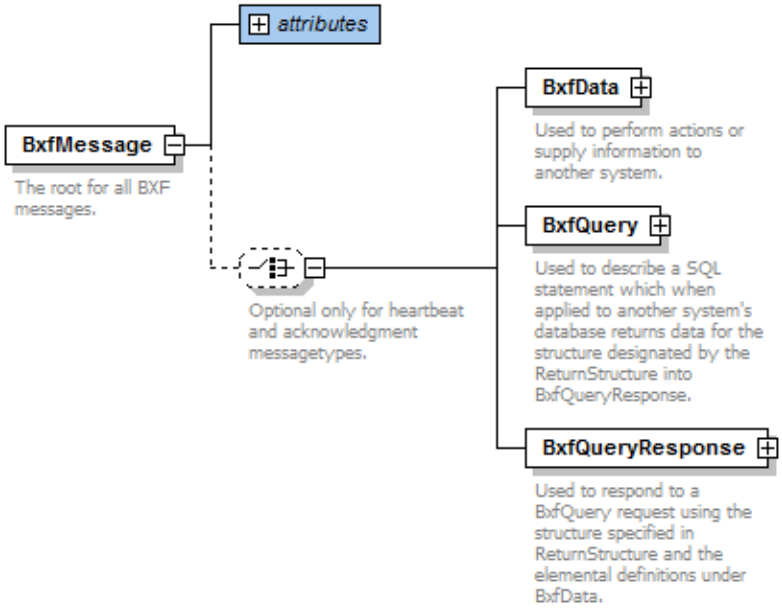
Choice: The choice compositor shows the 'or' relationship between associated components (only one choice can be made).



Solid lines: Solid lines connecting elements represent mandatory connections within the schema diagrams.

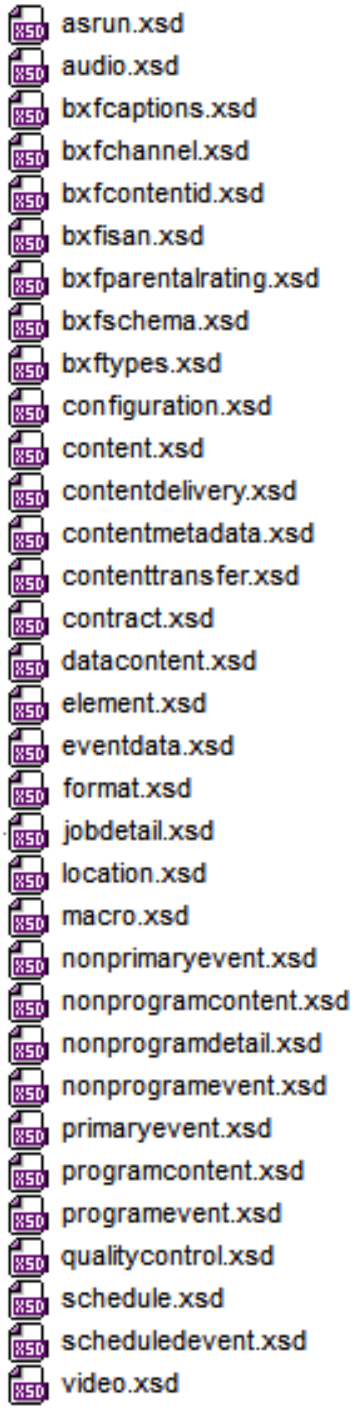


Dashed lines: Dashed lines between elements represent optional connections within the schema diagrams.



4.1 Schema File List

The Schema is actually composed of 33 files listed below. The root file (starting point) is bxfshema.xsd and all other files are referenced from this file. A brief description of each file is given below in alphabetical order. This same description can also be contained in the schema for major elements, but some elements do not contain a description and were segregated into separate files for the convenience of managing the schema. Note that two new XSD's have been added as part of version 5.0, ContentDelivery.XSD and QualityControl.XSD and these have a more detailed review, but do not have the textual representation included due to their length. The reader is asked to reference the actual XSD or the HTML version to review these in more detail.



Header Change in BXF 5.0

All XSD file headers have the same change regarding copyright and targetNameSpace:

```
<!-- Copyright 2017 Society of Motion Picture and Television Engineers. All rights reserved. -->

<xs:schema xmlns="http://smpte-ra.org/schemas/2021/2017/BXF"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:pmcp="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1" targetNamespace="http://smpte-
ra.org/schemas/2021/2017/BXF" elementFormDefault="qualified" attributeFormDefault="unqualified"
version="5.000">
```

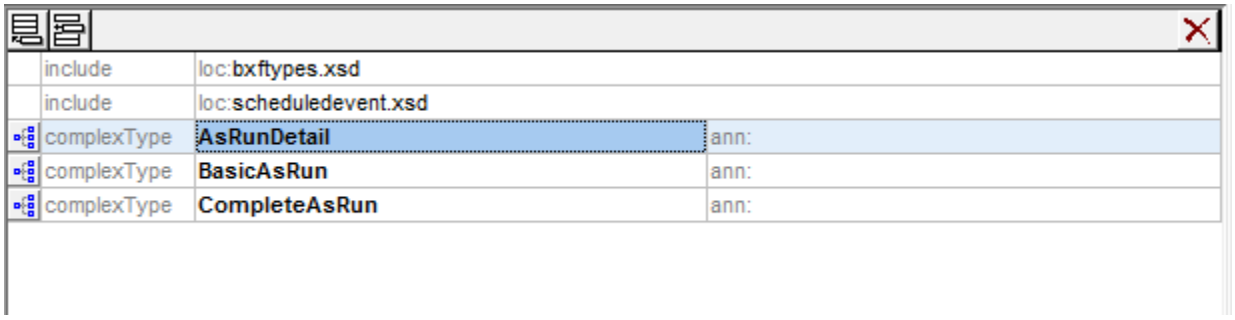
Most of the XSDs (25) had only their header changed, and are listed below. There are six XSD's with more substantial changes and two new XSD's that comprise the complete release of v5.0.

Asrun.XSD
Audio.XSD
BXFCaptions.XSD
BXFChannels.XSD
BXFContentID.XSD
BXFISAN.XSD
BXFParentalRating.XSD
Configuration.XSD
Content.XSD
ContentTransfer.XSD
Contract.XSD
DataContent.XSD
Element.XSD
EventData.XSD
Format.XSD
JobDetail.XSD
Location.XSD
Macro.XSD
NonProgramContent.XSD
NonProgramEvent.XSD
PrimaryEvent.XSD
ProgramContent.XSD
ProgramEvent.XSD
Schedule.XSD
Video.XSD

Schema Details and Changes for Version 5.0

4.1.1 Asrun.XSD

Contains:

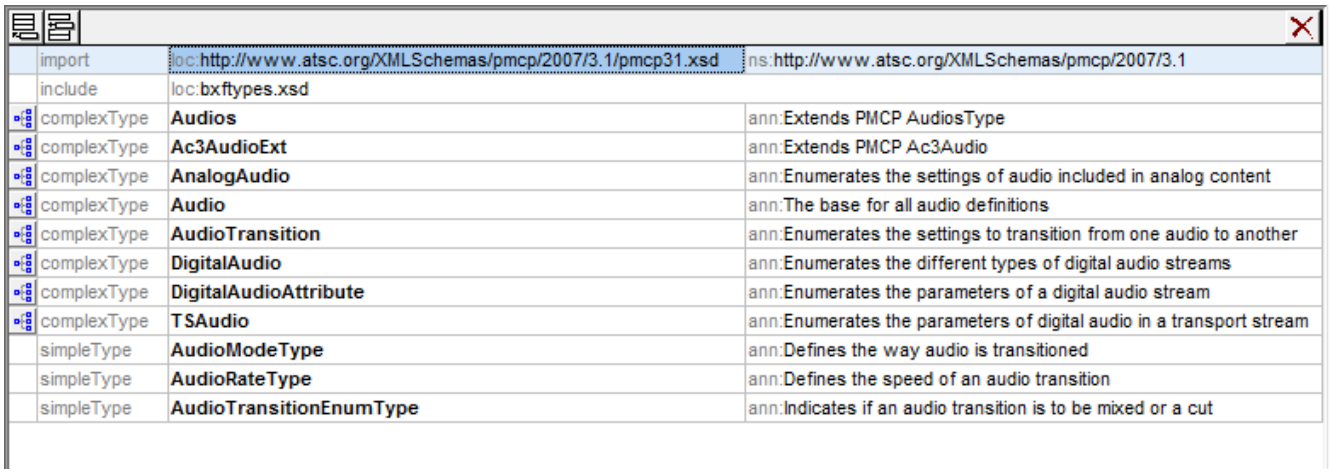


	include	loc:bxftypes.xsd	
	include	loc:scheduledevent.xsd	
complexType	**AsRunDetail**	ann:	
complexType	**BasicAsRun**	ann:	
complexType	**CompleteAsRun**	ann:	

Used to describe the exact timing of events on a schedule after the event has been aired, including any errors or other problems that occurred during the broadcast or transmission of the content.

4.1.2 Audio.XSD

Contains:

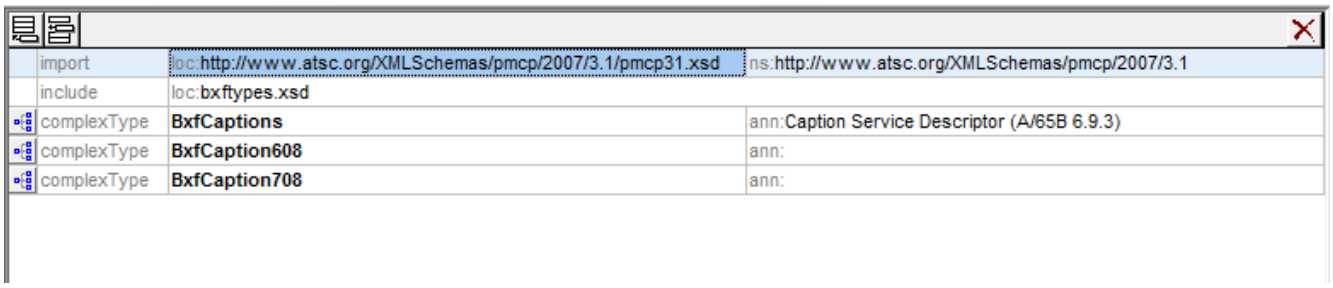


import	loc:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd	ns:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1	
include	loc:bxftypes.xsd		
complexType	**Audios**	ann:Extends PMCP AudiosType	
complexType	**Ac3AudioExt**	ann:Extends PMCP Ac3Audio	
complexType	**AnalogAudio**	ann:Enumerates the settings of audio included in analog content	
complexType	**Audio**	ann:The base for all audio definitions	
complexType	**AudioTransition**	ann:Enumerates the settings to transition from one audio to another	
complexType	**DigitalAudio**	ann:Enumerates the different types of digital audio streams	
complexType	**DigitalAudioAttribute**	ann:Enumerates the parameters of a digital audio stream	
complexType	**TSAudio**	ann:Enumerates the parameters of digital audio in a transport stream	
simpleType	**AudioModeType**	ann:Defines the way audio is transitioned	
simpleType	**AudioRateType**	ann:Defines the speed of an audio transition	
simpleType	**AudioTransitionEnumType**	ann:Indicates if an audio transition is to be mixed or a cut	

The basis for all audio definitions.

4.1.3 BxfCaptions.XSD

Contains:

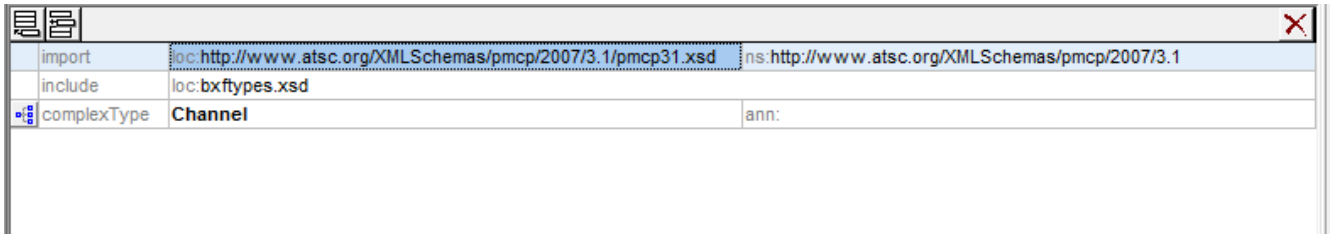


import	loc:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd	ns:http://www.atsc.org/XMLSchemas/pmcp/2007/3.1	
include	loc:bxftypes.xsd		
complexType	**BxfCaptions**	ann:Caption Service Descriptor (A/65B 6.9.3)	
complexType	**BxfCaption608**	ann:	
complexType	**BxfCaption708**	ann:	

Caption Service Descriptor (A/65B 6.9.3).

4.1.4 BxfChannel.XSD

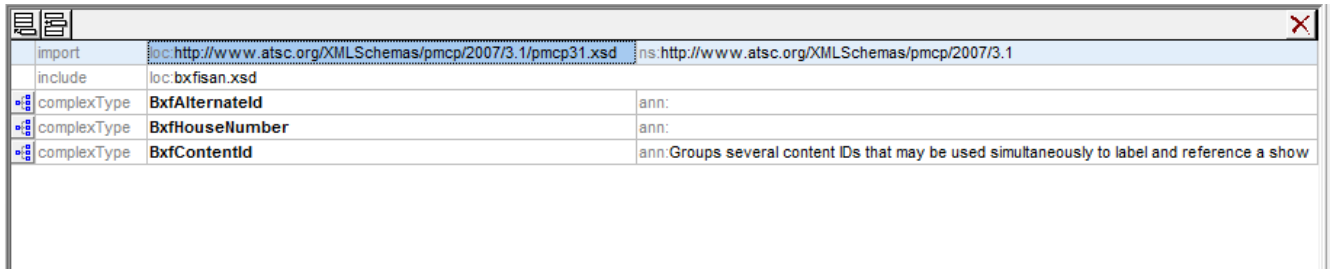
Contains:



Extends ATSC's PMCP 3.1 definition of a channel.

4.1.5 BxfContentId.XSD

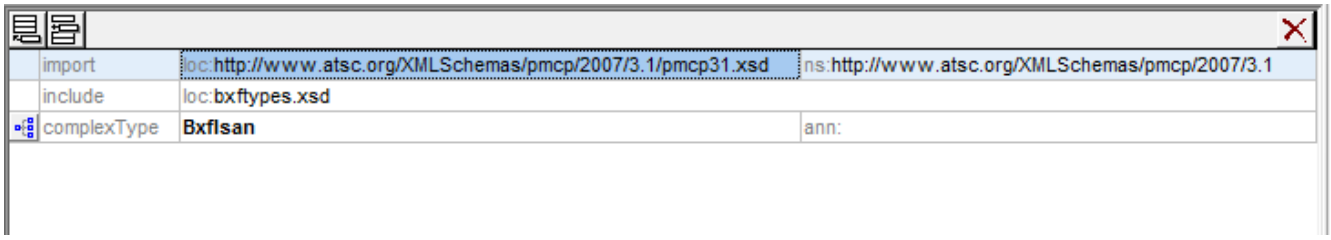
Contains:



Groups several Content IDs that can be used simultaneously to label and reference a show. In Version 2, support was added for the reuse of House Numbers by adding "duration of effectiveness" as supported under ATSC's A57/B standard.

4.1.6 BxfISAN.XSD

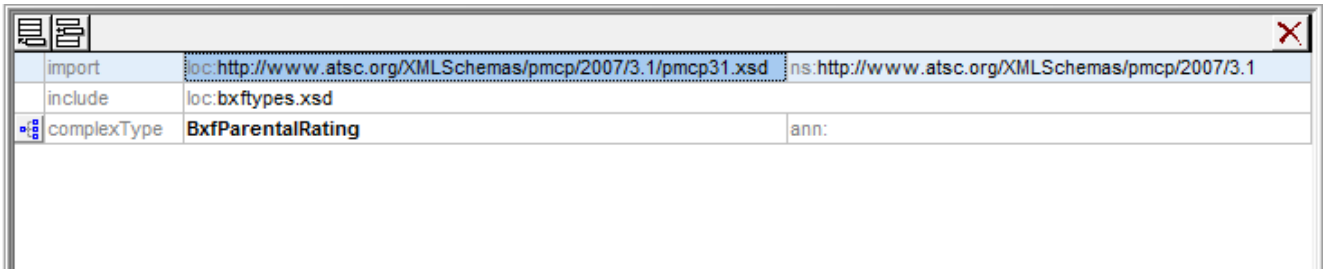
Contains:



Used to define entry of an ISAN value into ContentID. Go to www.isan.org for more information on the use of ISAN with content identification.

4.1.7 BxfParentalRating.XSD

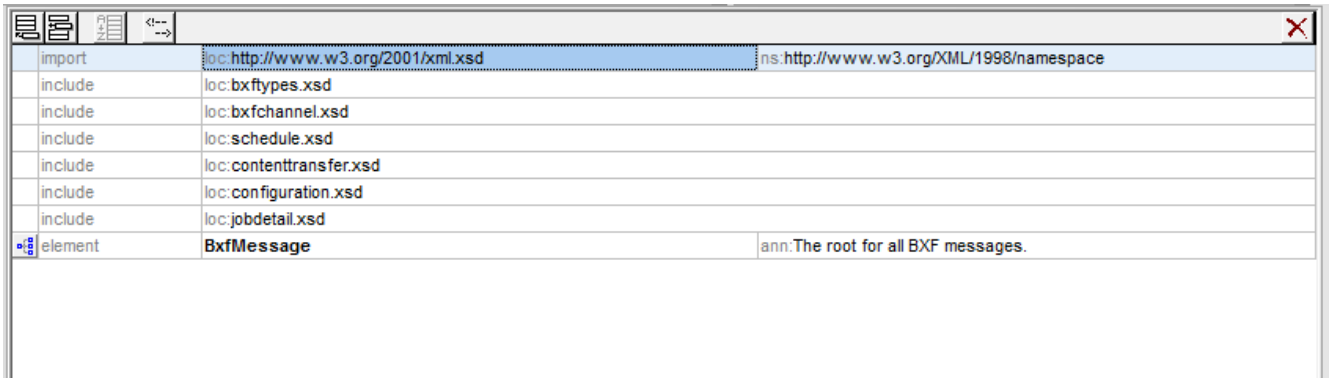
Contains:



Used to define entry of parental rating values as an extension of ATSC's PMCP 3.1.

4.1.8 BxfSchema.XSD

Contains:



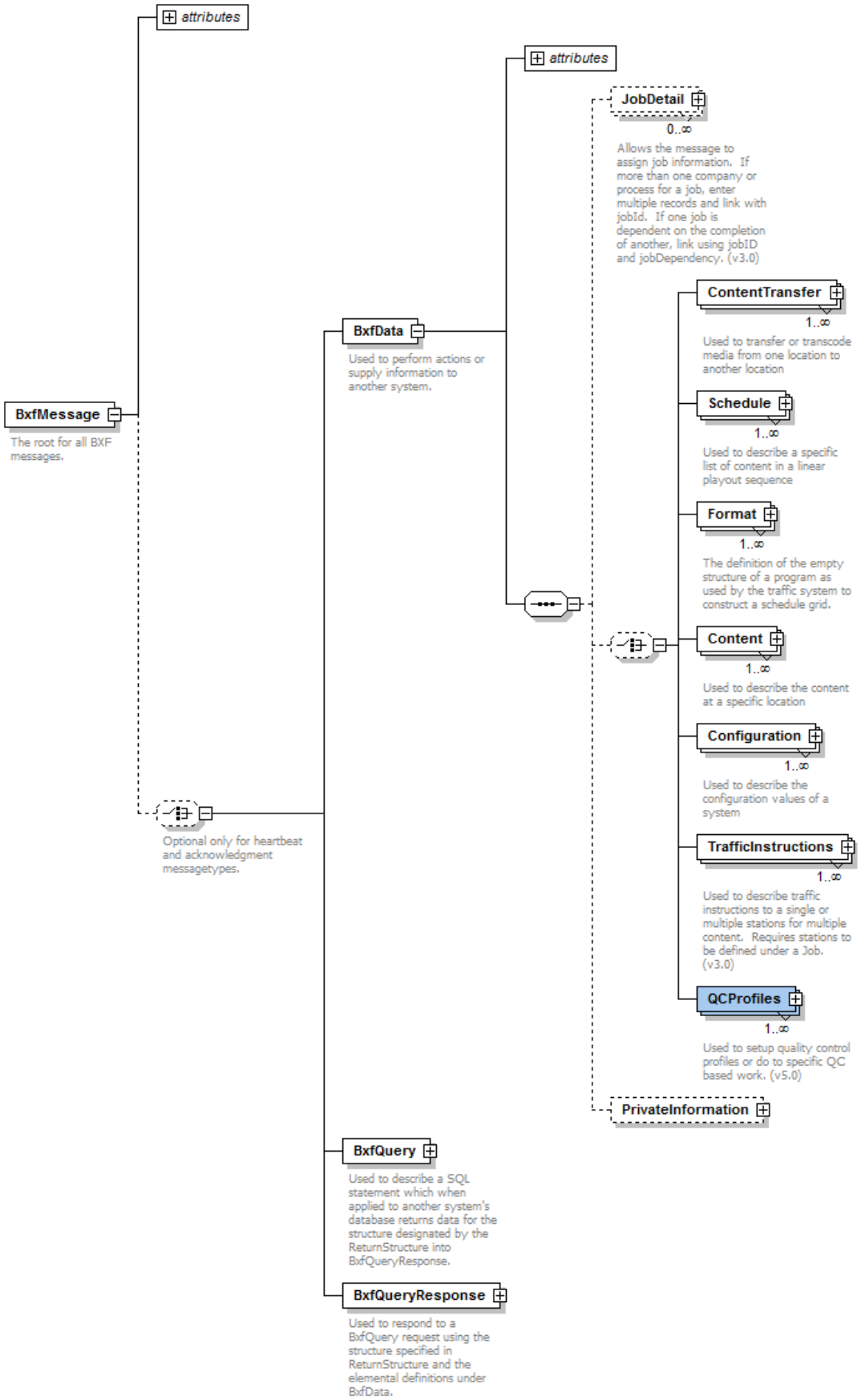
The root for all BXF messages.

4.1.8.1 BXF 5.0 Changes

Description of change:
Under BxfData, a new choice option has been added, QCProfiles, to enable quality control managent. This uses a new Type, QualityControl, defined in the new QualityControl.XSD that has been added as a new file in the schema package. As a result, the new qualitycontrol.xsd has been included as part of the schedule xs:include statement.

Text representation:

```
<xs:include schemaLocation="qualitycontrol.xsd"/>

<xs:element name="QCProfiles" type="QualityControl" maxOccurs="unbounded">
      <xs:annotation>
      <xs:documentation>Used to setup quality control profiles or do to specific QC based work. (v5.0)
      </xs:documentation>
      </xs:annotation>
</xs:element>
```



4.1.9 BxfTypes.XSD

Contains:

Used as to store all the utility elements that are used by most of the other schema files.

4.1.9.1 BXF 5.0 Changes

Description of change:
Smpte258MTimeCode was modified to support 60 fps. A new attributeGroup, QCTypeUnitRep, is added to support quality control functions by defining a specific set of Types, Units and Representations used as part of the QC process. Enumeration options are based on the current work done by the EBU and are expected to change as new technologies are introduced. See QualityControl for utilization with elements: ParameterValue, ExpectedValue, and TestValue.

Text representations:

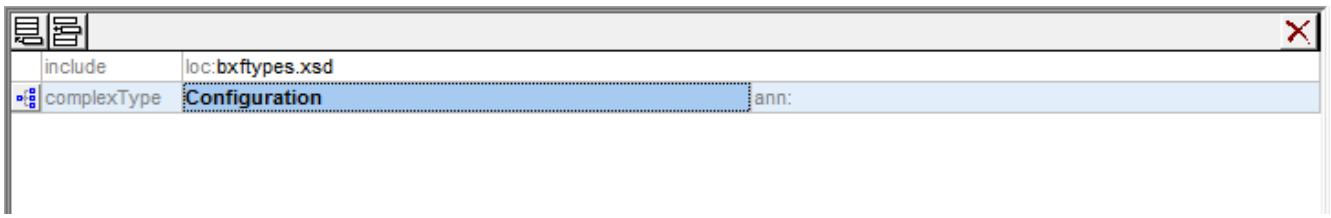
```
<xs:simpleType name="Smpte258MTimeCode">
    <xs:annotation>
        <xs:documentation>Reference SMPTE 258M, section 8 that supports 60 frames per second (v5.0)
        </xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:token">
        <xs:pattern value="(([0-1][0-9])|([2][0-3])):[0-5][0-9]:[0-5][0-9](([.,])|([:;]))[0-5][0-9]"/>
    </xs:restriction>
</xs:simpleType>


<xs:attributeGroup name="QCTypeUnitRep">
    <xs:annotation>
        <xs:documentation>Used to set the allowed Types, Units and Representations for QC test items as of
December 2016.  Expected to change with future technologies. (v5.0)</xs:documentation>
    </xs:annotation>
    <xs:attribute name="valueType">
        <xs:simpleType>
            <xs:restriction base="xs:string">
                <xs:enumeration value="boolean"/>
                <xs:enumeration value="date"/>
                <xs:enumeration value="dateTime"/>
                <xs:enumeration value="enumeration"/>
```

```
                    <xs:enumeration value="enumeration list"/>
                    <xs:enumeration value="integer"/>
                    <xs:enumeration value="integer list"/>
                    <xs:enumeration value="language"/>
                    <xs:enumeration value="real number"/>
                    <xs:enumeration value="real number list"/>
                    <xs:enumeration value="segment"/>
                    <xs:enumeration value="string"/>
                    <xs:enumeration value="string list"/>
                    <xs:enumeration value="time"/>
                    <xs:enumeration value="timecode"/>
                    <xs:enumeration value="universal label"/>
                    <xs:enumeration value="universal label list"/>
                    <xs:enumeration value="other"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="measurementUnit">
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="bit/s"/>
                    <xs:enumeration value="bits"/>
                    <xs:enumeration value="byte/s"/>
                    <xs:enumeration value="bytes"/>
                    <xs:enumeration value="dB"/>
                    <xs:enumeration value="dBFS"/>
                    <xs:enumeration value="dBTP"/>
                    <xs:enumeration value="field/s"/>
                    <xs:enumeration value="fields"/>
                    <xs:enumeration value="frame/s"/>
                    <xs:enumeration value="frames"/>
                    <xs:enumeration value="hh:mm:ss:ff"/>
                    <xs:enumeration value="hours"/>
                    <xs:enumeration value="Hz"/>
                    <xs:enumeration value="kB"/>
                    <xs:enumeration value="kB/s"/>
                    <xs:enumeration value="kbit/s"/>
                    <xs:enumeration value="kbits"/>
                    <xs:enumeration value="kHz"/>
                    <xs:enumeration value="lines"/>
                    <xs:enumeration value="LU"/>
                    <xs:enumeration value="LUFS"/>
                    <xs:enumeration value="MB"/>
                    <xs:enumeration value="MB/s"/>
                    <xs:enumeration value="Mbit/s"/>
                    <xs:enumeration value="Mbits"/>
                    <xs:enumeration value="MHz"/>
                    <xs:enumeration value="ms"/>
                    <xs:enumeration value="ns"/>
                    <xs:enumeration value="pixels"/>
                    <xs:enumeration value="sample/s"/>
                    <xs:enumeration value="samples"/>
                    <xs:enumeration value="seconds"/>
                    <xs:enumeration value="other"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="representation">
```

```
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="1 digit for second fraction"/>
                    <xs:enumeration value="2 digits for second fraction"/>
                    <xs:enumeration value="3 digits for second fraction"/>
                    <xs:enumeration value="binary"/>
                    <xs:enumeration value="binary left padded with zeros to length 2"/>
                    <xs:enumeration value="binary left padded with zeros to length 3"/>
                    <xs:enumeration value="binary left padded with zeros to length 4"/>
                    <xs:enumeration value="binary left padded with zeros to length 5"/>
                    <xs:enumeration value="binary left padded with zeros to length x"/>
                    <xs:enumeration value="decimal"/>
                    <xs:enumeration value="decimal with 1 fractional digit"/>
                    <xs:enumeration value="decimal with 2 fractional digits"/>
                    <xs:enumeration value="decimal with 3 fractional digits"/>
                    <xs:enumeration value="decimal with x fractional digits"/>
                    <xs:enumeration value="fraction"/>
                    <xs:enumeration value="hexadecimal"/>
                    <xs:enumeration value="hh:mm:ss:ff"/>
                    <xs:enumeration value="hh:mm:ss;ff"/>
                    <xs:enumeration value="percentage"/>
                    <xs:enumeration value="percentage with 1 fractional digit"/>
                    <xs:enumeration value="percentage with 2 fractional digits"/>
                    <xs:enumeration value="percentage with 3 fractional digits"/>
                    <xs:enumeration value="percentage with x fractional digits"/>
                    <xs:enumeration value="x digits for second fractions"/>
                    <xs:enumeration value="{a,b,...}"/>
                    <xs:enumeration value="{true,false}"/>
                    <xs:enumeration value="other"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
</xs:attributeGroup>
```

4.1.10 Configuration.XSD

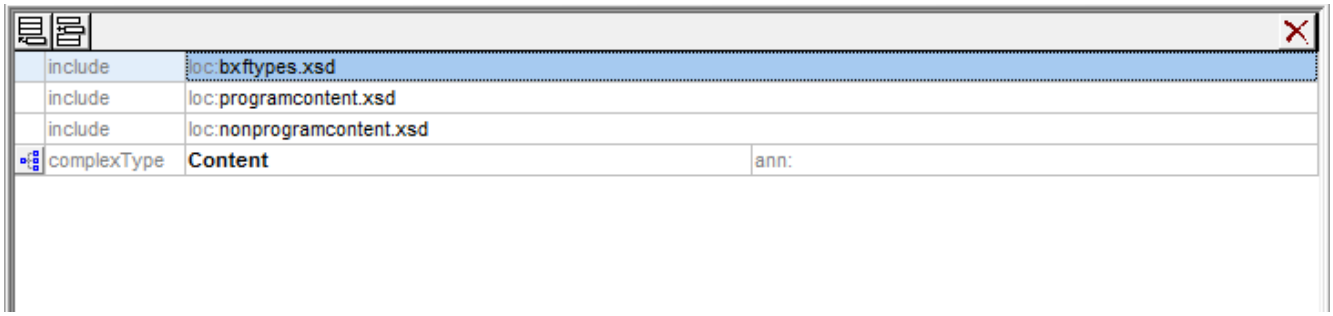
Contains:



Used to describe the configuration values of a system, to be shared with other BXF-compliant systems.

4.1.11 Content.XSD

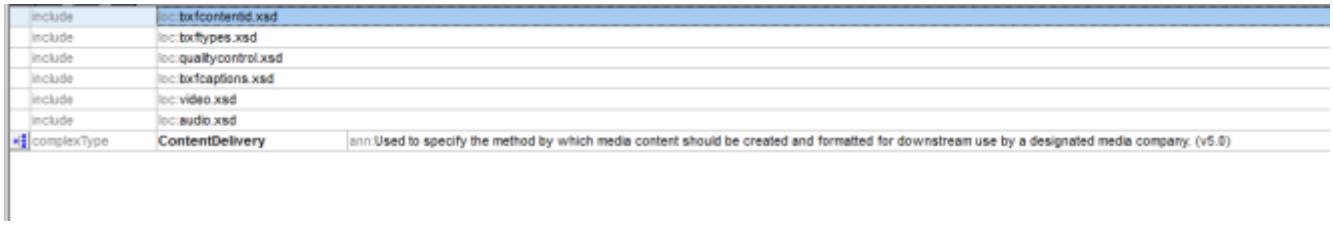
Contains:



Used to describe the content at a specific location.

4.1.12 ContentDelivery.XSD **New**

Contains:

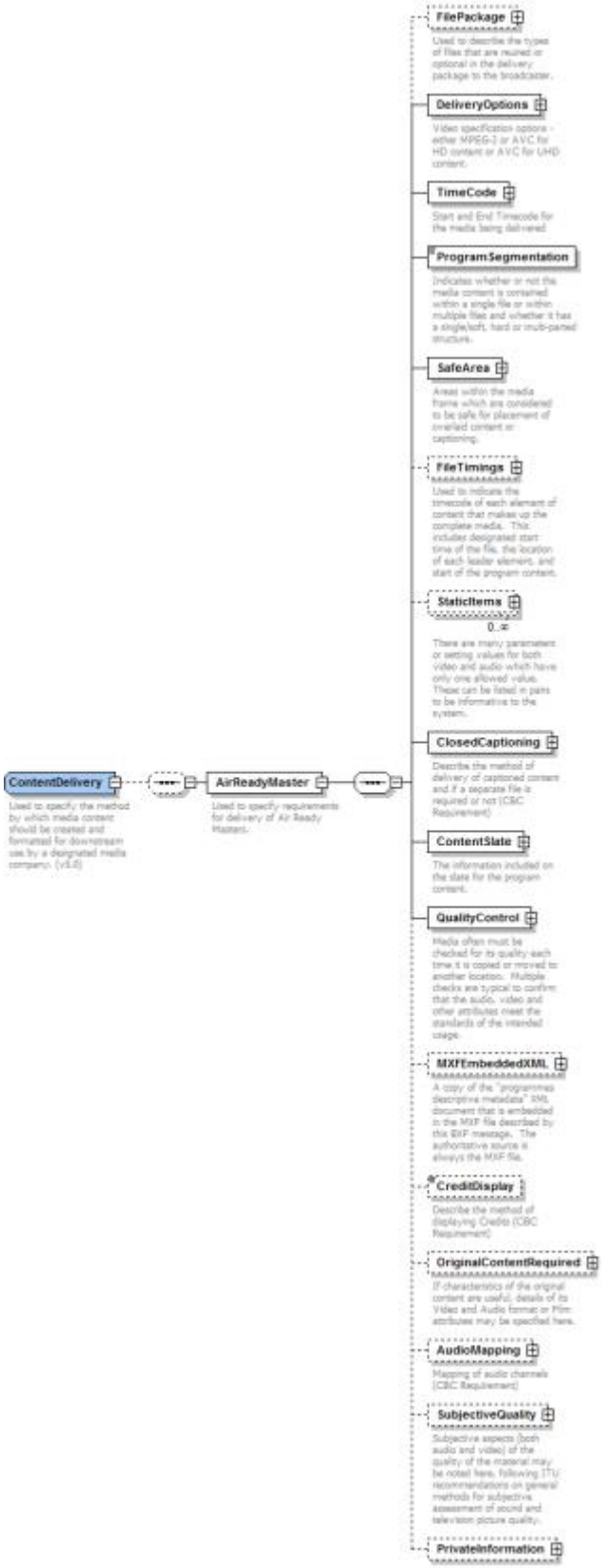


Used to specify the method by which media content can be created and formatted for downstream use by a designated media company. Accessed by a new element choice under Media complex type defined in ContentMetaData.XSD (see below). Due to its size, the individual elements are extracted and shown in order they appear below with their graphic details.

```
<xs:complexType name="ContentDelivery">
	<xs:annotation>
	<xs:documentation>Used to specify the method by which media content can be created and formatted for downstream use by a designated media company. (v5.0)</xs:documentation>
	</xs:annotation>
		<xs:sequence minOccurs="0">
			<xs:element name="AirReadyMaster">
				<xs:annotation>
				<xs:documentation>Used to specify requirements for delivery of Air Ready Masters.</xs:documentation>
				</xs:annotation>
				<xs:complexType>
					<xs:sequence>
						<xs:element name="FilePackage" minOccurs="0">
						<xs:annotation>
						<xs:documentation>Used to describe the types of files that are reuired or optional in the delivery package to the broadcaster.</xs:documentation>
						</xs:annotation>
						…</xs:element>
						<xs:element name="DeliveryOptions">
						<xs:annotation>
						<xs:documentation>Video specification options - either MPEG-2 or AVC for HD content or AVC for UHD content.</xs:documentation>
						</xs:annotation>
						…</xs:element>
						<xs:element name="TimeCode">
						<xs:annotation>
						<xs:documentation>Start and End Timecode for the media being delivered</xs:documentation>
						</xs:annotation>
```

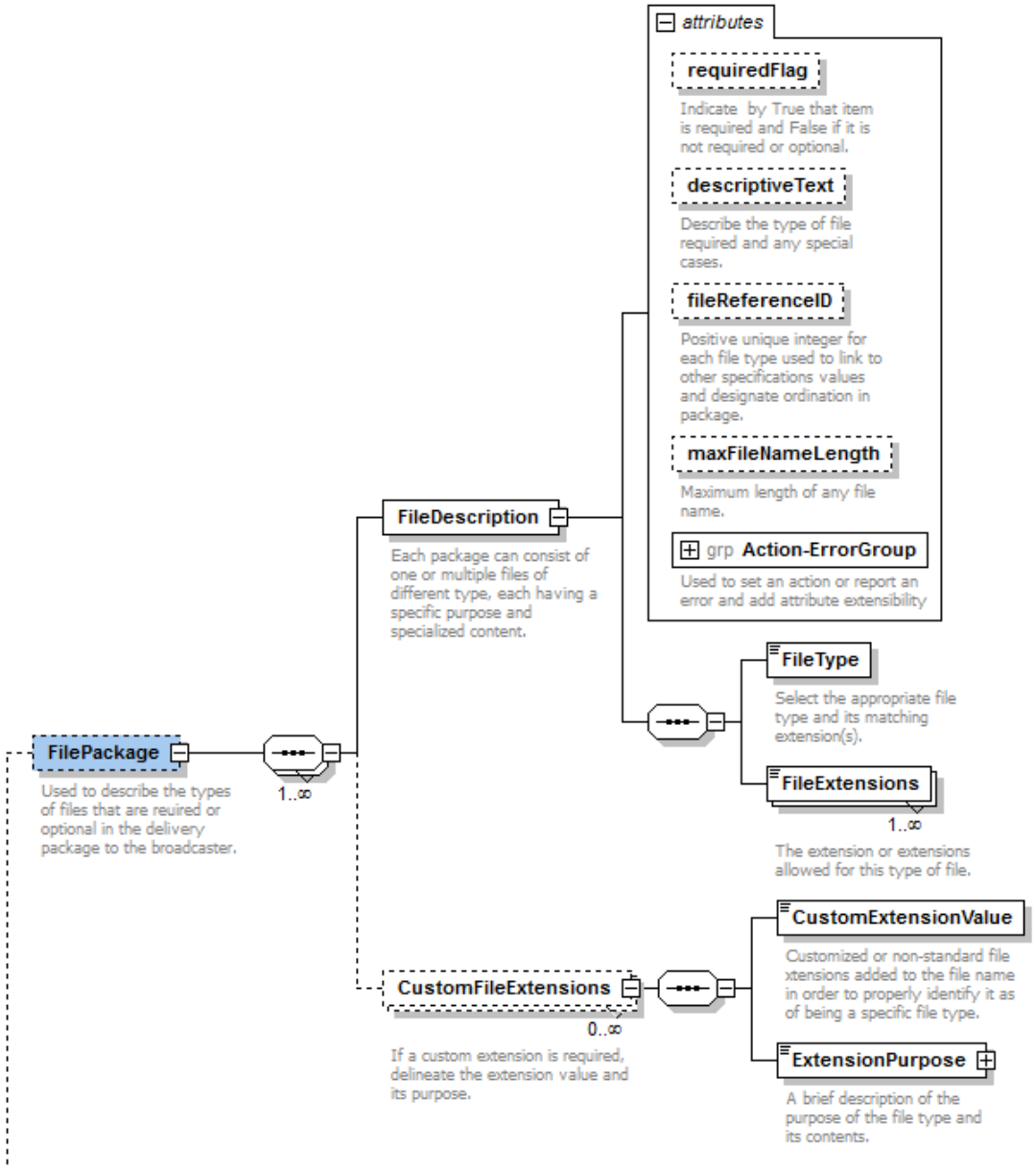
```
                                    …</xs:element>
                                    <xs:element name="ProgramSegmentation">
                                    <xs:annotation>
                                    <xs:documentation>Indicates whether or not the media content is contained within a single file or within multiple
files and whether it has a single/soft, hard or multi-parted structure.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="SafeArea">
                                    <xs:annotation>
                                    <xs:documentation>Areas within the media frame which are considered to be safe for placement of overlaid
content or captioning.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="FileTimings" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>Used to indicate the timecode of each element of content that makes up the complete
media.  This includes designated start time of the file, the location of each leader element, and start of the program content.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="StaticItems" minOccurs="0" maxOccurs="unbounded">
                                    <xs:annotation>
                                    <xs:documentation>There are many parameters or setting values for both video and audio which have only one
allowed value.  These can be listed in pairs to be informative to the system.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="ClosedCaptioning">
                                    <xs:annotation>
                                    <xs:documentation>Describe the method of delivery of captioned content and if a separate file is required or not
(CBC Requirement)</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="ContentSlate">
                                    <xs:annotation>
                                    <xs:documentation>The information included on the slate for the program content.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="QualityControl">
                                    <xs:annotation>
                                    <xs:documentation>Media often must be checked for its quality each time it is copied or moved to another
location.  Multiple checks are typical to confirm that the audio, video and other attributes meet the standards of the intended
usage.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="MXFEmbeddedXML" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>A copy of the "programmes descriptive metadata" XML document that is embedded in the
MXF file described by this BXF message.  The authoritative source is always the MXF file.</xs:documentation>
                                    </xs:annotation>

                                    …</xs:element>
                                    <xs:element name="CreditDisplay" type="xs:string" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>Describe the method of displaying Credits (CBC Requirement)</xs:documentation>
                                    </xs:annotation>
                                    </xs:element>
                                    <xs:element name="OriginalContentRequired" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>If characteristics of the original content are useful, details of its Video and Audio format or
Film attributes can be specified here.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="AudioMapping" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>Mapping of audio channels (CBC Requirement)</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="SubjectiveQuality" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>Subjective aspects (both audio and video) of the quality of the material can be noted here,
following ITU recommendations on general methods for subjective assessment of sound and television picture quality.</xs:documentation>
                                    </xs:annotation>
                                    …</xs:element>
                                    <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
                                </xs:sequence>
                            </xs:complexType>
                        </xs:element>
                    </xs:sequence>
```

</xs:complexType>



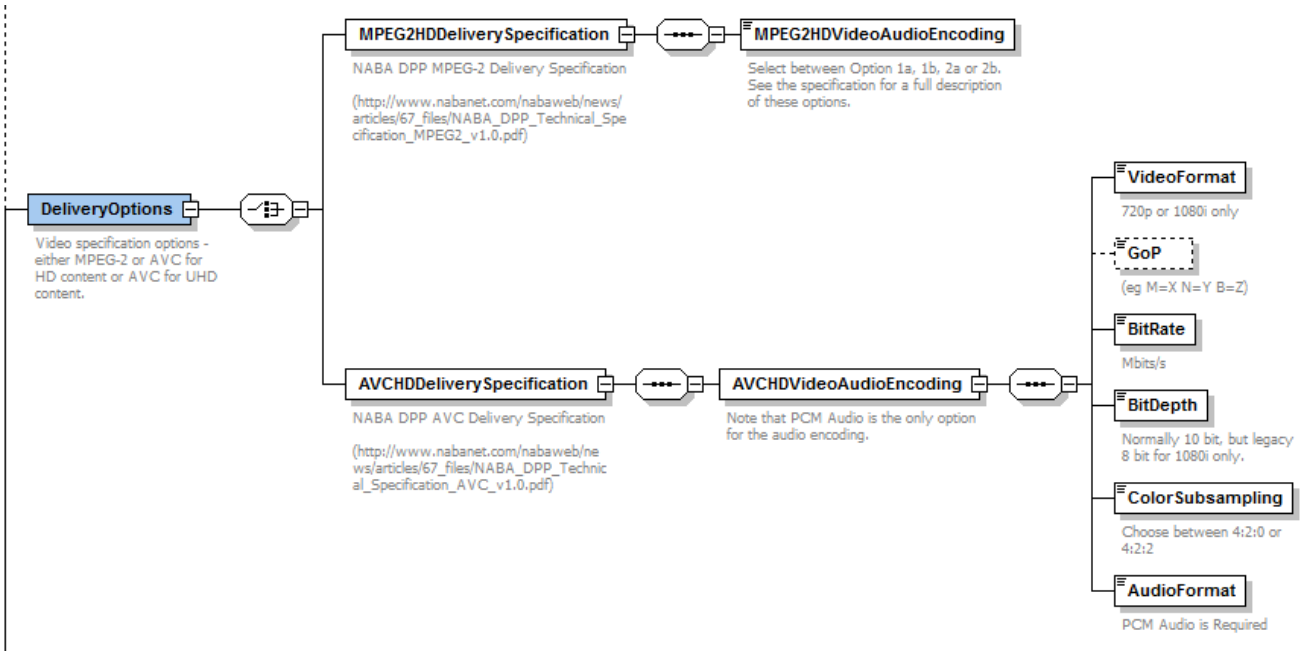
```
<xs:element name="FilePackage" minOccurs="0">
<xs:annotation>
<xs:documentation>Used to describe the types of files that are reuired or optional in the delivery package to the broadcaster.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence maxOccurs="unbounded">
                        <xs:element name="FileDescription">
                        <xs:annotation>
                        <xs:documentation>Each package can consist of one or multiple files of different type, each having a specific purpose and
specialized content.</xs:documentation>
                        </xs:annotation>
                                <xs:complexType>
                                        <xs:sequence>
                                                <xs:element name="FileType">
                                                <xs:annotation>
                                                <xs:documentation>Select the appropriate file type and its matching extension(s).</xs:documentation>
                                                </xs:annotation>
                                                        <xs:simpleType>
                                                                <xs:restriction base="xs:string">
                                                                        <xs:enumeration value="Video/Audio-Converted"/>
                                                                        <xs:enumeration value="Video/Audio-Original"/>
                                                                        <xs:enumeration value="Closed Captioning"/>
                                                                        <xs:enumeration value="Metadata File"/>
                                                                        <xs:enumeration value="Gallery"/>
                                                                        <xs:enumeration value="Still Images"/>
                                                                        <xs:enumeration value="Custom"/>
                                                                </xs:restriction>
                                                        </xs:simpleType>
                                                </xs:element>
                                                <xs:element name="FileExtensions" maxOccurs="unbounded">
                                                <xs:annotation>
                                                <xs:documentation>The extension or extensions allowed for this type of file.</xs:documentation>
                                                </xs:annotation>
                                                        <xs:simpleType>
                                                                <xs:restriction base="xs:string">
                                                                        <xs:enumeration value=".MXF"/>
                                                                        <xs:enumeration value=".MOV"/>
                                                                        <xs:enumeration value=".SCC"/>
                                                                        <xs:enumeration value=".XML"/>
                                                                        <xs:enumeration value="_Gallery.JPEG"/>
                                                                        <xs:enumeration value="_Still_#.JPEG (1-4)"/>
                                                                        <xs:enumeration value="Custom"/>
                                                                </xs:restriction>
                                                        </xs:simpleType>
                                                </xs:element>
                                        </xs:sequence>
                                                <xs:attribute name="requiredFlag" type="xs:boolean">
                                                <xs:annotation>
                                                <xs:documentation>Indicate  by True that item is required and False if it is not required or
optional.</xs:documentation>
                                                </xs:annotation>
                                                </xs:attribute>
                                                <xs:attribute name="descriptiveText" type="xs:string">
                                                <xs:annotation>
                                                <xs:documentation>Describe the type of file required and any special cases.</xs:documentation>
                                                </xs:annotation>
                                                </xs:attribute>
                                                <xs:attribute name="fileReferenceID" type="xs:positiveInteger">
                                                <xs:annotation>
                                                <xs:documentation>Positive unique integer for each file type used to link to other specifications values and
designate ordination in package.</xs:documentation>
                                                </xs:annotation>
                                                </xs:attribute>
                                                <xs:attribute name="maxFileNameLength" type="xs:positiveInteger">
                                                <xs:annotation>
                                                <xs:documentation>Maximum length of any file name.</xs:documentation>
                                                </xs:annotation>
                                                </xs:attribute>
                                                <xs:attributeGroup ref="Action-ErrorGroup"/>
                                </xs:complexType>
                        </xs:element>
                        <xs:element name="CustomFileExtensions" minOccurs="0" maxOccurs="unbounded">
                        <xs:annotation>
                        <xs:documentation>If a custom extension is required, delineate the extension value and its purpose.</xs:documentation>
                        </xs:annotation>
                                <xs:complexType>
                                        <xs:sequence>
```

```
                                        <xs:element name="CustomExtensionValue">
                                        <xs:annotation>
                                        <xs:documentation>Customized or non-standard file xtensions added to the file name in order to properly
identify it as of being a specific file type.</xs:documentation>
                                        </xs:annotation>
                                            <xs:simpleType>
                                                <xs:restriction base="xs:string">
                                                </xs:restriction>
                                            </xs:simpleType>
                                        </xs:element>
                                        <xs:element name="ExtensionPurpose" type="BxfText">
                                        <xs:annotation>
                                        <xs:documentation>A brief description of the purpose of the file type and its contents.</xs:documentation>
                                        </xs:annotation>
                                        </xs:element>
                                    </xs:sequence>
                                </xs:complexType>
                            </xs:element>
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
```

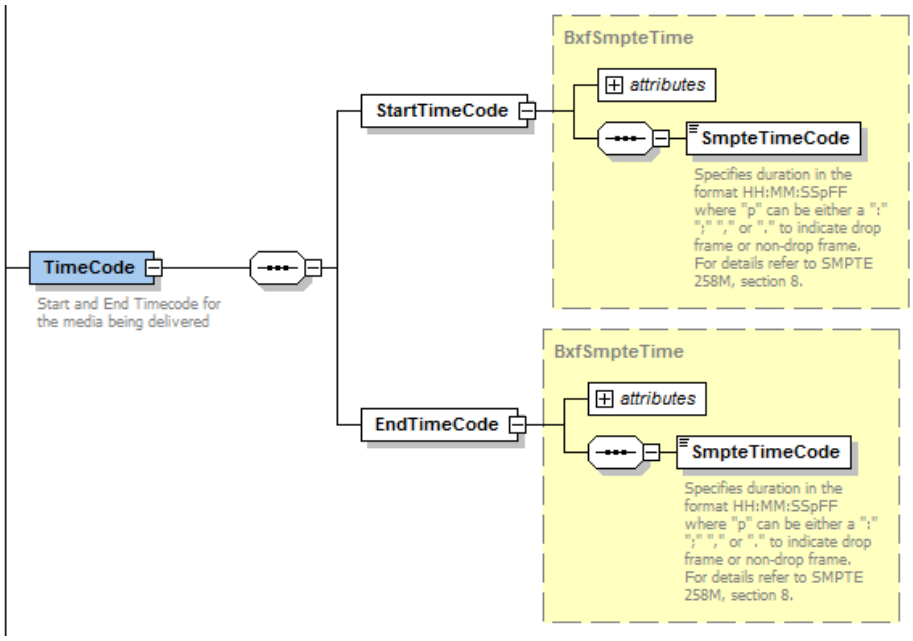


```
<xs:element name="DeliveryOptions">
<xs:annotation>
<xs:documentation>Video specification options - either MPEG-2 or AVC for HD content or AVC for UHD content.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:choice>
                        <xs:element name="MPEG2HDDeliverySpecification">
                        <xs:annotation>
                        <xs:documentation>NABA DPP MPEG-2 Delivery
Specification  (http://www.nabanet.com/nabaweb/news/articles/67_files/NABA_DPP_Technical_Specification_MPEG2_v1.0.pdf)</xs:documentation>
                        </xs:annotation>
                                <xs:complexType>
                                        <xs:sequence>
                                                <xs:element name="MPEG2HDVideoAudioEncoding">
                                                <xs:annotation>
                                                <xs:documentation>Select between Option 1a, 1b, 2a or 2b.  See the specification for a full description of these
options.</xs:documentation>
                                                </xs:annotation>
                                                        <xs:simpleType>
                                                                <xs:restriction base="xs:string">
                                                                        <xs:enumeration value="Option 1a"/>
                                                                        <xs:enumeration value="Option 1b"/>
                                                                        <xs:enumeration value="Option 2a"/>
                                                                        <xs:enumeration value="Option 2b"/>
                                                                </xs:restriction>
                                                        </xs:simpleType>
                                                </xs:element>
                                        </xs:sequence>
                                </xs:complexType>
                        </xs:element>
                        <xs:element name="AVCHDDeliverySpecification">
                        <xs:annotation>
                        <xs:documentation>NABA DPP AVC Delivery
Specification  (http://www.nabanet.com/nabaweb/news/articles/67_files/NABA_DPP_Technical_Specification_AVC_v1.0.pdf)</xs:documentation>
                        </xs:annotation>
                                <xs:complexType>
                                        <xs:sequence>
                                                <xs:element name="AVCHDVideoAudioEncoding">
                                                <xs:annotation>
                                                <xs:documentation>Note that PCM Audio is the only option for the audio encoding.</xs:documentation>
                                                </xs:annotation>
                                                        <xs:complexType>
                                                                <xs:sequence>
                                                                        <xs:element name="VideoFormat">
                                                                        <xs:annotation>
                                                                        <xs:documentation>720p or 1080i only</xs:documentation>
                                                                        </xs:annotation>
                                                                                <xs:simpleType>
                                                                                        <xs:restriction base="xs:string">
                                                                                                <xs:enumeration value="720p/59.94"/>
                                                                                                <xs:enumeration value="1080i/29.97"/>
                                                                                        </xs:restriction>
                                                                                </xs:simpleType>
                                                                        </xs:element>
                                                                        <xs:element name="GoP" minOccurs="0">
                                                                        <xs:annotation>
                                                                        <xs:documentation>(eg M=X N=Y B=Z)</xs:documentation>
                                                                        </xs:annotation>
                                                                                <xs:simpleType>
                                                                                        <xs:restriction base="xs:string">
                                                                                        </xs:restriction>
                                                                                </xs:simpleType>
                                                                        </xs:element>
                                                                        <xs:element name="BitRate" type="xs:integer">
                                                                        <xs:annotation>
                                                                        <xs:documentation>Mbits/s</xs:documentation>
                                                                        </xs:annotation>
                                                                        </xs:element>
                                                                        <xs:element name="BitDepth">
                                                                        <xs:annotation>
                                                                        <xs:documentation>Normally 10 bit, but legacy 8 bit for 1080i only.</xs:documentation>
                                                                        </xs:annotation>
                                                                                <xs:simpleType>
                                                                                        <xs:restriction base="xs:integer">
                                                                                                <xs:enumeration value="8"/>
                                                                                                <xs:enumeration value="10"/>
                                                                                        </xs:restriction>
```

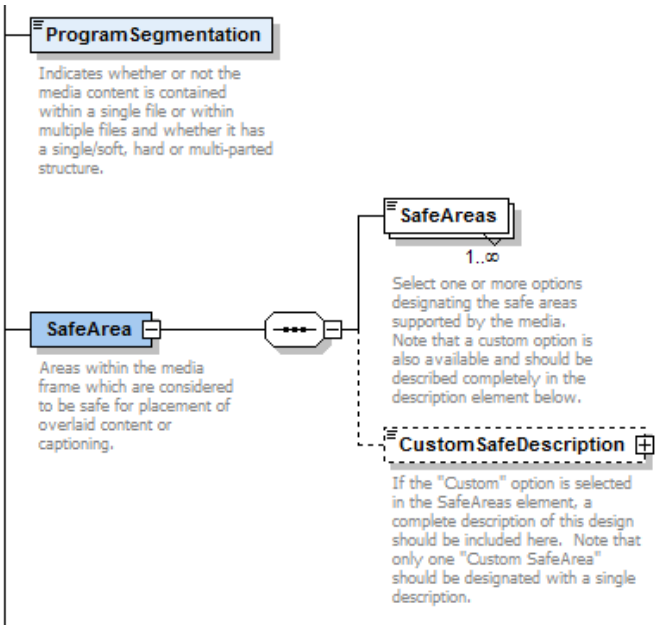
```
                                                </xs:simpleType>
                                        </xs:element>
                                        <xs:element name="ColorSubsampling">
                                        <xs:annotation>
                                        <xs:documentation>Choose between 4:2:0 or 4:2:2</xs:documentation>
                                        </xs:annotation>
                                                <xs:simpleType>
                                                        <xs:restriction base="xs:string">
                                                                <xs:enumeration value="4:2:0"/>
                                                                <xs:enumeration value="4:2:2"/>
                                                        </xs:restriction>
                                                </xs:simpleType>
                                        </xs:element>
                                        <xs:element name="AudioFormat" default="PCM">
                                        <xs:annotation>
                                        <xs:documentation>PCM Audio is Required</xs:documentation>
                                        </xs:annotation>
                                                <xs:simpleType>
                                                        <xs:restriction base="xs:string">
                                                                <xs:enumeration value="PCM"/>
                                                        </xs:restriction>
                                                </xs:simpleType>
                                        </xs:element>
                                </xs:sequence>
                        </xs:complexType>
                </xs:element>
        </xs:sequence>
</xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element>
```




```
<xs:element name="TimeCode">
<xs:annotation>
<xs:documentation>Start and End Timecode for the media being delivered</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:element name="StartTimeCode" type="BxfSmpteTime"/>
                        <xs:element name="EndTimeCode" type="BxfSmpteTime"/>
                </xs:sequence>
        </xs:complexType>
</xs:element>
```

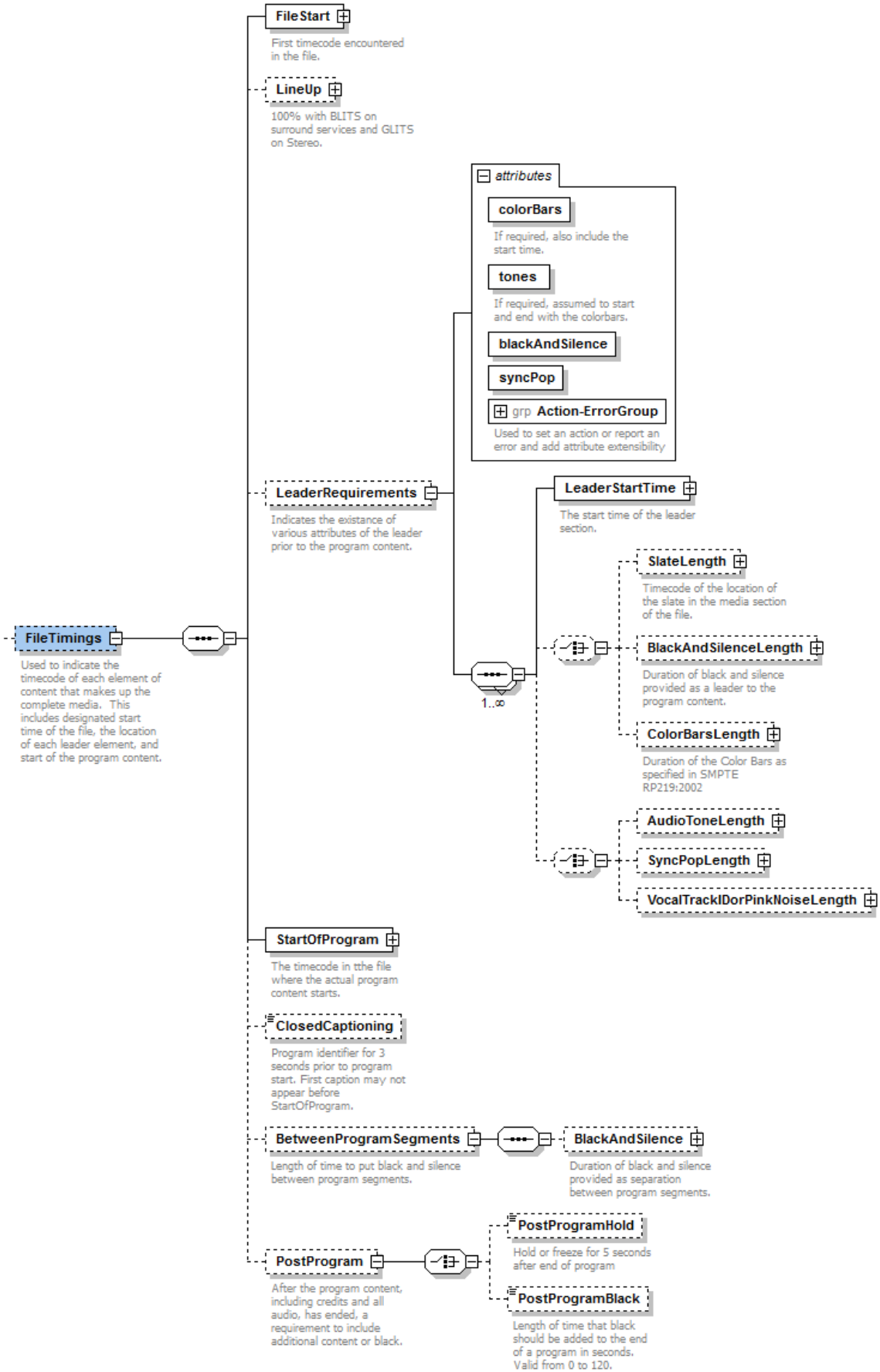



```
<xs:element name="ProgramSegmentation">
<xs:annotation>
<xs:documentation>Indicates whether or not the media content is contained within a single file or within multiple files and whether it has a single/soft, hard or multi-parted structure.</xs:documentation>
</xs:annotation>
	<xs:simpleType>
		<xs:restriction base="xs:string">
			<xs:enumeration value="Single Part or Soft Parted Program (Single File)"/>
			<xs:enumeration value="Hard Parted Program (Single File)"/>
			<xs:enumeration value="Multi-part Program Delivered on Multiple Files"/>
		</xs:restriction>
	</xs:simpleType>
</xs:element>
<xs:element name="SafeArea">
<xs:annotation>
<xs:documentation>Areas within the media frame which are considered to be safe for placement of overlaid content or captioning.</xs:documentation>
</xs:annotation>
	<xs:complexType>
		<xs:sequence>
			<xs:element name="SafeAreas" maxOccurs="unbounded">
			<xs:annotation>
			<xs:documentation>Select one or more options designating the safe areas supported by the media.  Note that a custom option is also available and can be described completely in the description element below.</xs:documentation>
			</xs:annotation>
				<xs:simpleType>
					<xs:restriction base="xs:string">
						<xs:enumeration value="Action Safe (720p)"/>
						<xs:enumeration value="Caption Safe (16:9 - 720p)"/>
						<xs:enumeration value="Caption Safe (4:3 - 720p)"/>
						<xs:enumeration value="Action Safe (1080i)"/>
						<xs:enumeration value="Caption Safe (16:9 - 1080i)"/>
						<xs:enumeration value="Caption Safe (4:3 - 1080i)"/>
						<xs:enumeration value="Custom"/>
					</xs:restriction>
				</xs:simpleType>
			</xs:element>
			<xs:element name="CustomSafeDescription" type="BxfText" minOccurs="0">
			<xs:annotation>
			<xs:documentation>If the "Custom" option is selected in the SafeAreas element, a complete description of this design can be included here.  Note that only one "Custom SafeArea" is designated with a single description.</xs:documentation>
			</xs:annotation>
			</xs:element>
		</xs:sequence>
	</xs:complexType>
</xs:element>
```

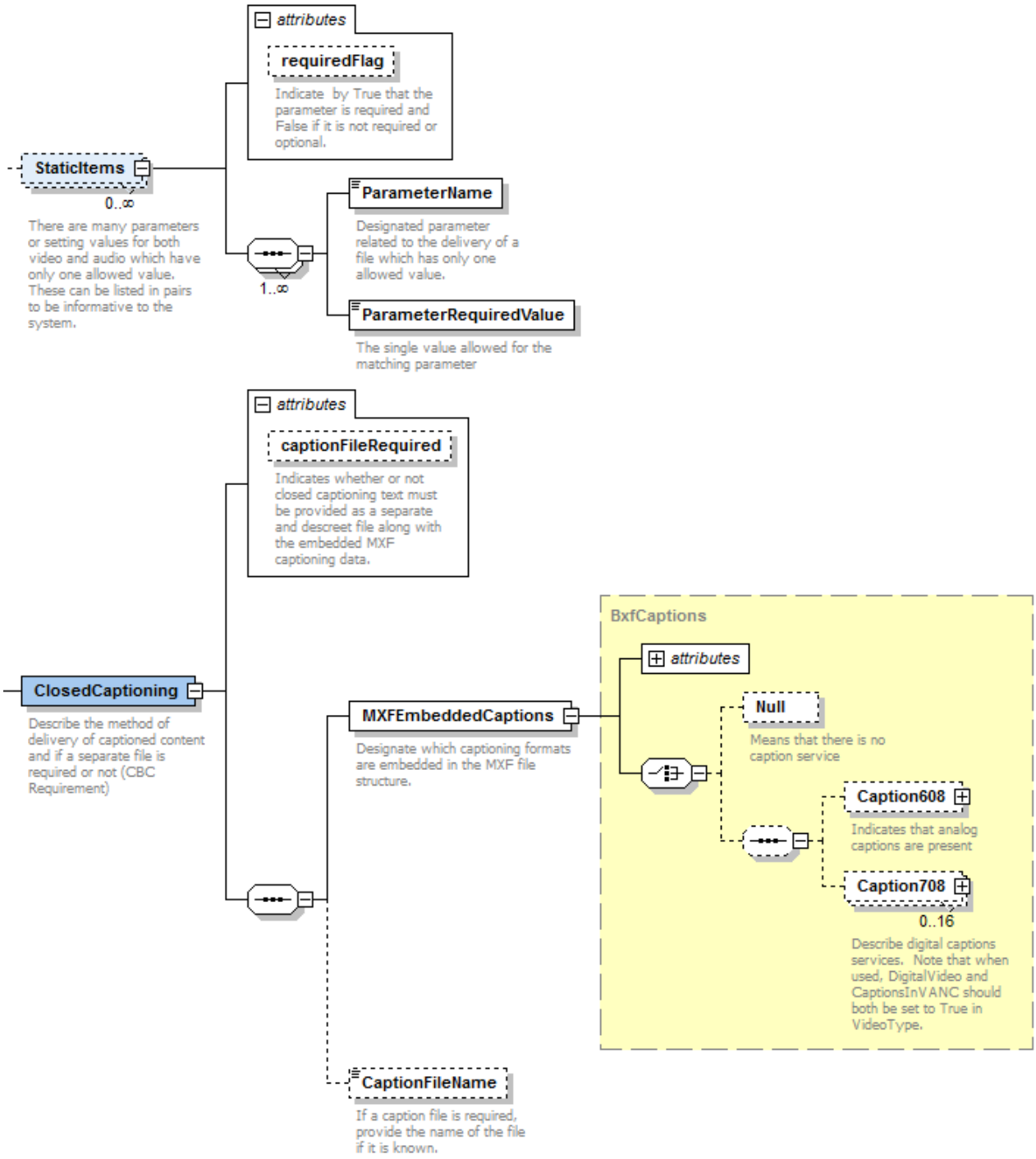



```
<xs:element name="FileTimings" minOccurs="0">
<xs:annotation>
<xs:documentation>Used to indicate the timecode of each element of content that makes up the complete media.  This includes designated start time of the file, the location of each leader element, and start of the program content.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:element name="FileStart" type="BxfSmpteTime">
                        <xs:annotation>
                        <xs:documentation>First timecode encountered in the file.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="LineUp" type="BxfSmpteTime" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>100% with BLITS on surround services and GLITS on Stereo.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="LeaderRequirements" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>Indicates the existance of various attributes of the leader prior to the program content.</xs:documentation>
                        </xs:annotation>
                                <xs:complexType>
                                        <xs:sequence maxOccurs="unbounded">
                                                <xs:element name="LeaderStartTime" type="BxfSmpteTime">
                                                <xs:annotation>
                                                <xs:documentation>The start time of the leader section.</xs:documentation>
                                                </xs:annotation>
                                                </xs:element>
                                                <xs:choice minOccurs="0">
                                                        <xs:element name="SlateLength" type="BxfSmpteTime" minOccurs="0">
                                                        <xs:annotation>
                                                        <xs:documentation>Timecode of the location of the slate in the media section of the file.</xs:documentation>
                                                        </xs:annotation>
                                                        </xs:element>
                                                        <xs:element name="BlackAndSilenceLength" type="BxfSmpteTime" minOccurs="0">
                                                        <xs:annotation>
                                                        <xs:documentation>Duration of black and silence provided as a leader to the program content.</xs:documentation>
                                                        </xs:annotation>
                                                        </xs:element>
                                                        <xs:element name="ColorBarsLength" type="BxfSmpteTime" minOccurs="0">
                                                        <xs:annotation>
                                                        <xs:documentation>Duration of the Color Bars as specified in SMPTE RP219:2002</xs:documentation>
                                                        </xs:annotation>
                                                        </xs:element>
                                                </xs:choice>
                                                <xs:choice minOccurs="0">
                                                        <xs:element name="AudioToneLength" type="BxfSmpteTime" minOccurs="0"/>
```

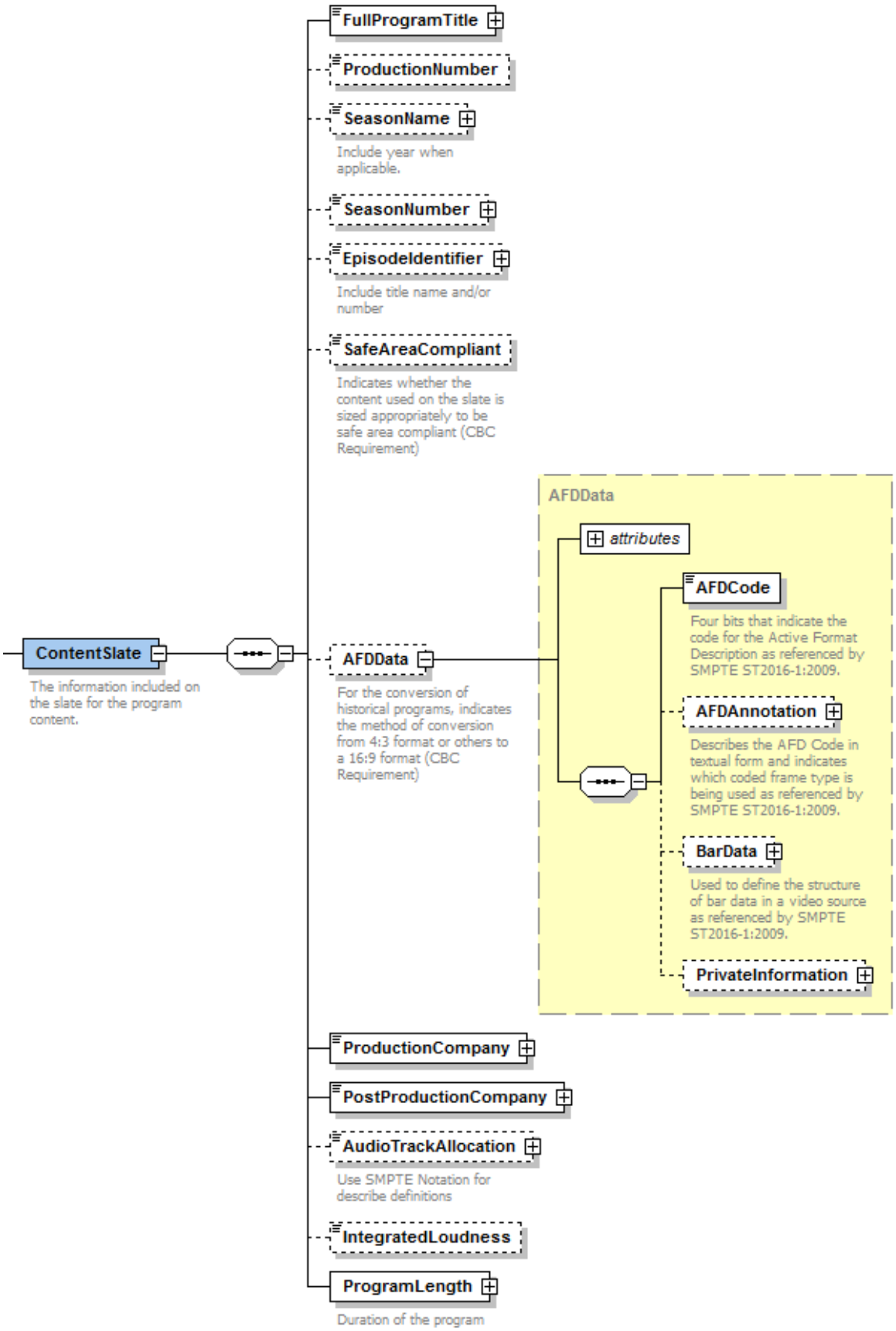
```
                                        <xs:element name="SyncPopLength" type="BxfSmpteTime" minOccurs="0"/>
                                        <xs:element name="VocalTrackIDorPinkNoiseLength" type="BxfSmpteTime" minOccurs="0"/>
                                    </xs:choice>
                                </xs:sequence>
                                <xs:attribute name="colorBars" type="xs:boolean" use="required">
                                <xs:annotation>
                                <xs:documentation>If required, also include the start time.</xs:documentation>
                                </xs:annotation>
                                </xs:attribute>
                                <xs:attribute name="tones" type="xs:boolean" use="required">
                                <xs:annotation>
                                <xs:documentation>If required, assumed to start and end with the colorbars.</xs:documentation>
                                </xs:annotation>
                                </xs:attribute>
                                <xs:attribute name="blackAndSilence" type="xs:boolean" use="required"/>
                                <xs:attribute name="syncPop" type="xs:boolean" use="required"/>
                                <xs:attributeGroup ref="Action-ErrorGroup"/>
                            </xs:complexType>
                        </xs:element>
                        <xs:element name="StartOfProgram" type="BxfSmpteTime">
                        <xs:annotation>
                        <xs:documentation>The timecode in tthe file where the actual program content starts.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="ClosedCaptioning" type="xs:boolean" default="0" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>Program identifier for 3 seconds prior to program start. First caption cannot appear before
StartOfProgram.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="BetweenProgramSegments" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>Length of time to put black and silence between program segments.</xs:documentation>
                        </xs:annotation>
                            <xs:complexType>
                                <xs:sequence>
                                    <xs:element name="BlackAndSilence" type="BxfSmpteTime" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>Duration of black and silence provided as separation between program
segments.</xs:documentation>
                                    </xs:annotation>
                                    </xs:element>
                                </xs:sequence>
                            </xs:complexType>
                        </xs:element>
                        <xs:element name="PostProgram" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>After the program content, including credits and all audio, has ended, a requirement to include additional
content or black.</xs:documentation>
                        </xs:annotation>
                            <xs:complexType>
                                <xs:choice>
                                    <xs:element name="PostProgramHold" type="xs:boolean" default="0" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>Hold or freeze for 5 seconds after end of program</xs:documentation>
                                    </xs:annotation>
                                    </xs:element>
                                    <xs:element name="PostProgramBlack" default="0" minOccurs="0">
                                    <xs:annotation>
                                    <xs:documentation>Length of time that black is to be added to the end of a program in seconds.  Valid from 0 to
120.</xs:documentation>
                                    </xs:annotation>
                                        <xs:simpleType>
                                            <xs:restriction base="xs:nonNegativeInteger">
                                                <xs:maxInclusive value="120"/>
                                                <xs:minInclusive value="0"/>
                                            </xs:restriction>
                                        </xs:simpleType>
                                    </xs:element>
                                </xs:choice>
                            </xs:complexType>
                        </xs:element>
                    </xs:sequence>
                </xs:complexType>
</xs:element>
```



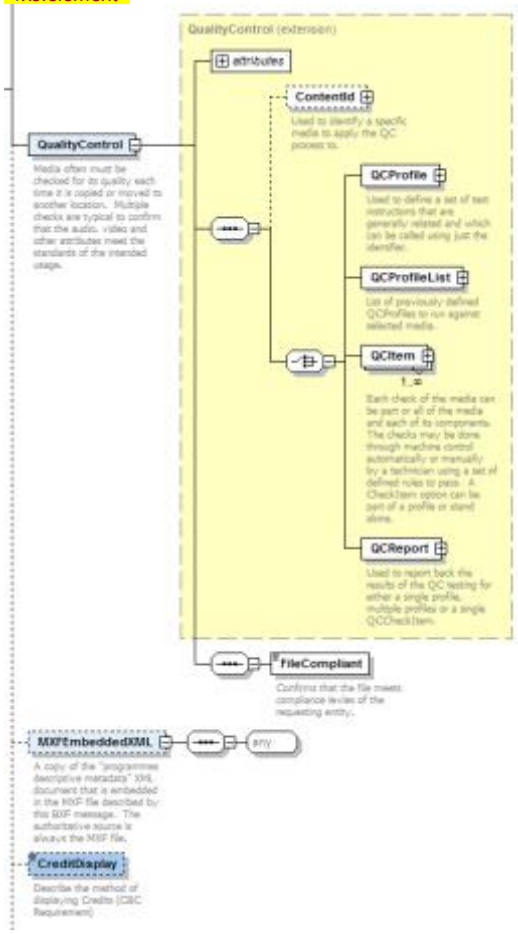
```
<xs:element name="StaticItems" minOccurs="0" maxOccurs="unbounded">
<xs:annotation>
<xs:documentation>There are many parameters or setting values for both video and audio which have only one allowed value.  These can be listed in pairs to be informative to the system.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence maxOccurs="unbounded">
                        <xs:element name="ParameterName" type="xs:string">
                        <xs:annotation>
                        <xs:documentation>Designated parameter related to the delivery of a file which has only one allowed value.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="ParameterRequiredValue" type="xs:string">
                        <xs:annotation>
                        <xs:documentation>The single value allowed for the matching parameter</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                </xs:sequence>
                <xs:attribute name="requiredFlag" type="xs:boolean">
                <xs:annotation>
                <xs:documentation>Indicate  by True that the parameter is required and False if it is not required or optional.</xs:documentation>
                </xs:annotation>
                </xs:attribute>
        </xs:complexType>
</xs:element>
<xs:element name="ClosedCaptioning">
<xs:annotation>
<xs:documentation>Describe the method of delivery of captioned content and if a separate file is required or not (CBC Requirement)</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:element name="MXFEmbeddedCaptions" type="BxfCaptions">
                        <xs:annotation>
                        <xs:documentation>Designate which captioning formats are embedded in the MXF file structure.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="CaptionFileName" type="xs:string" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>If a caption file is required, provide the name of the file if it is known.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                </xs:sequence>
                <xs:attribute name="captionFileRequired" type="xs:boolean">
                <xs:annotation>
                <xs:documentation>Indicates whether or not closed captioning text must be provided as a separate and descreet file along with the embedded MXF captioning data.</xs:documentation>
                </xs:annotation>
                </xs:attribute>
        </xs:complexType>
</xs:element>
```



```
<xs:element name="ContentSlate">
<xs:annotation>
<xs:documentation>The information included on the slate for the program content.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:element name="FullProgramTitle" type="BxfText"/>
                        <xs:element name="ProductionNumber" type="xs:string" minOccurs="0"/>
                        <xs:element name="SeasonName" type="BxfText" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>Include year when applicable.</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="SeasonNumber" type="BxfText" minOccurs="0"/>
                        <xs:element name="EpisodeIdentifier" type="BxfText" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>Include title name and/or number</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="SafeAreaCompliant" type="xs:boolean" default="1" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>Indicates whether the content used on the slate is sized appropriately to be safe area compliant (CBC
Requirement)</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="AFDData" type="AFDData" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>For the conversion of historical programs, indicates the method of conversion from 4:3 format or others to a
16:9 format (CBC Requirement)</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="ProductionCompany" type="BxfText"/>
                        <xs:element name="PostProductionCompany" type="BxfText"/>
                        <xs:element name="AudioTrackAllocation" type="BxfText" minOccurs="0">
                        <xs:annotation>
                        <xs:documentation>Use SMPTE Notation for describe definitions</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                        <xs:element name="IntegratedLoudness" type="xs:integer" minOccurs="0"/>
                        <xs:element name="ProgramLength" type="BxfDuration">
                        <xs:annotation>
                        <xs:documentation>Duration of the program</xs:documentation>
                        </xs:annotation>
                        </xs:element>
                </xs:sequence>
        </xs:complexType>
</xs:element>
```

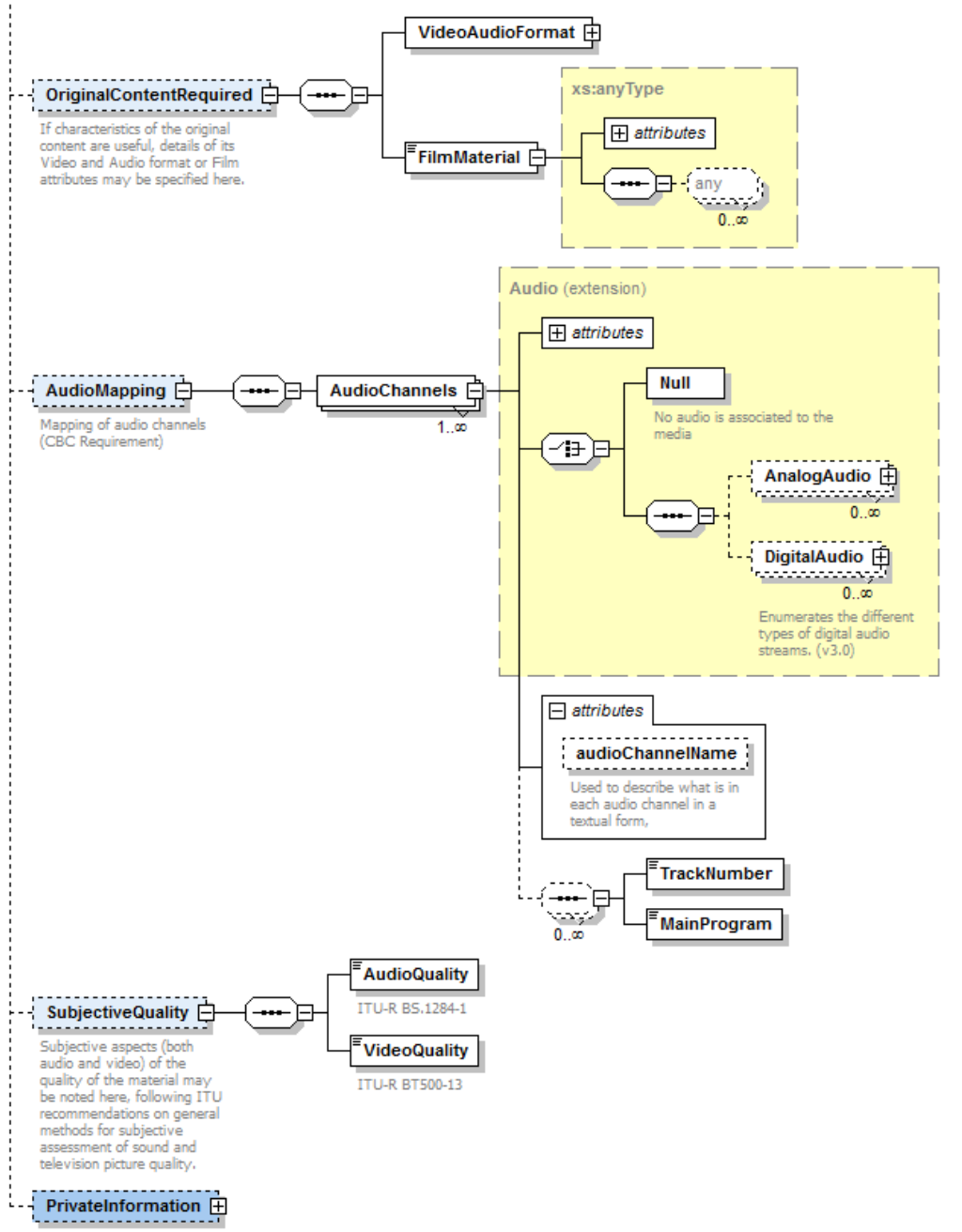


```
<xs:element name="QualityControl">
<xs:annotation>
<xs:documentation>Media often must be checked for its quality each time it is copied or moved to another location.  Multiple checks are typical to confirm that the audio, video and other attributes meet the standards of the intended usage.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:complexContent>
                        <xs:extension base="QualityControl">
                                <xs:sequence>
                                        <xs:element name="FileCompliant" type="xs:boolean">
                                        <xs:annotation>
                                        <xs:documentation>Confirms that the file meets compliance levles of the requesting entity.</xs:documentation>
                                        </xs:annotation>
                                        </xs:element>
                                </xs:sequence>
                        </xs:extension>
                </xs:complexContent>
        </xs:complexType>
</xs:element>
<xs:element name="MXFEmbeddedXML" minOccurs="0">
<xs:annotation>
<xs:documentation>A copy of the "programmes descriptive metadata" XML document that is embedded in the MXF file described by this BXF message.  The authoritative source is always the MXF file.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:any/>
                </xs:sequence>
        </xs:complexType>
</xs:element>
<xs:element name="CreditDisplay" type="xs:string" minOccurs="0">
<xs:annotation>
<xs:documentation>Describe the method of displaying Credits (CBC Requirement)</xs:documentation>
</xs:annotation>
</xs:element>
```



```
<xs:element name="OriginalContentRequired" minOccurs="0">
<xs:annotation>
<xs:documentation>If characteristics of the original content are useful, details of its Video and Audio format or Film attributes can be specified here.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:element name="VideoAudioFormat" type="Video"/>
                        <xs:element name="FilmMaterial" type="xs:anyType"/>
                </xs:sequence>
        </xs:complexType>
</xs:element>
<xs:element name="AudioMapping" minOccurs="0">
<xs:annotation>
<xs:documentation>Mapping of audio channels (CBC Requirement)</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:element name="AudioChannels" maxOccurs="unbounded">
                                <xs:complexType>
                                        <xs:complexContent>
                                                <xs:extension base="Audio">
                                                        <xs:sequence minOccurs="0" maxOccurs="unbounded">
                                                                <xs:element name="TrackNumber">
                                                                        <xs:simpleType>
                                                                                <xs:restriction base="xs:integer">
                                                                                        <xs:minInclusive value="1"/>
                                                                                        <xs:maxInclusive value="16"/>
                                                                                </xs:restriction>
                                                                        </xs:simpleType>
                                                                </xs:element>
                                                                <xs:element name="MainProgram">
                                                                        <xs:simpleType>
                                                                                <xs:restriction base="xs:string">
                                                                                        <xs:enumeration value="RightMain"/>
                                                                                        <xs:enumeration value="LeftMain"/>
                                                                                        <xs:enumeration value="Unused"/>
                                                                                        <xs:enumeration value="RRear"/>
                                                                                        <xs:enumeration value="LRear"/>
                                                                                        <xs:enumeration value="LFE"/>
                                                                                        <xs:enumeration value="DV"/>
                                                                                        <xs:enumeration value="LO"/>
                                                                                        <xs:enumeration value="RO"/>
                                                                                        <xs:enumeration value="Center"/>
                                                                                        <xs:enumeration value="Custom"/>
                                                                                </xs:restriction>
                                                                        </xs:simpleType>
                                                                </xs:element>
                                                        </xs:sequence>
                                                        <xs:attribute name="audioChannelName" type="xs:string">
                                                        <xs:annotation>
                                                        <xs:documentation>Used to describe what is in each audio channel in a textual form,</xs:documentation>
                                                        </xs:annotation>
                                                        </xs:attribute>
                                                </xs:extension>
                                        </xs:complexContent>
                                </xs:complexType>
                        </xs:element>
                </xs:sequence>
        </xs:complexType>
</xs:element>
<xs:element name="SubjectiveQuality" minOccurs="0">
<xs:annotation>
<xs:documentation>Subjective aspects (both audio and video) of the quality of the material can be noted here, following ITU recommendations on general methods for subjective assessment of sound and television picture quality.</xs:documentation>
</xs:annotation>
        <xs:complexType>
                <xs:sequence>
                        <xs:element name="AudioQuality">
                        <xs:annotation>
                        <xs:documentation>ITU-R BS.1284-1</xs:documentation>
                        </xs:annotation>
                                <xs:simpleType>
                                        <xs:restriction base="xs:integer">
                                                <xs:minInclusive value="1"/>
                                                <xs:maxInclusive value="5"/>
                                        </xs:restriction>
```

```
                        </xs:simpleType>
                    </xs:element>
                    <xs:element name="VideoQuality">
                    <xs:annotation>
                    <xs:documentation>ITU-R BT500-13</xs:documentation>
                    </xs:annotation>
                        <xs:simpleType>
                            <xs:restriction base="xs:integer">
                                <xs:minInclusive value="1"/>
                                <xs:maxInclusive value="5"/>
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                </xs:sequence>
            </xs:complexType>
</xs:element>
<xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
```



4.1.13 ContentMetadata.XSD

Contains:

Content identification and other details.

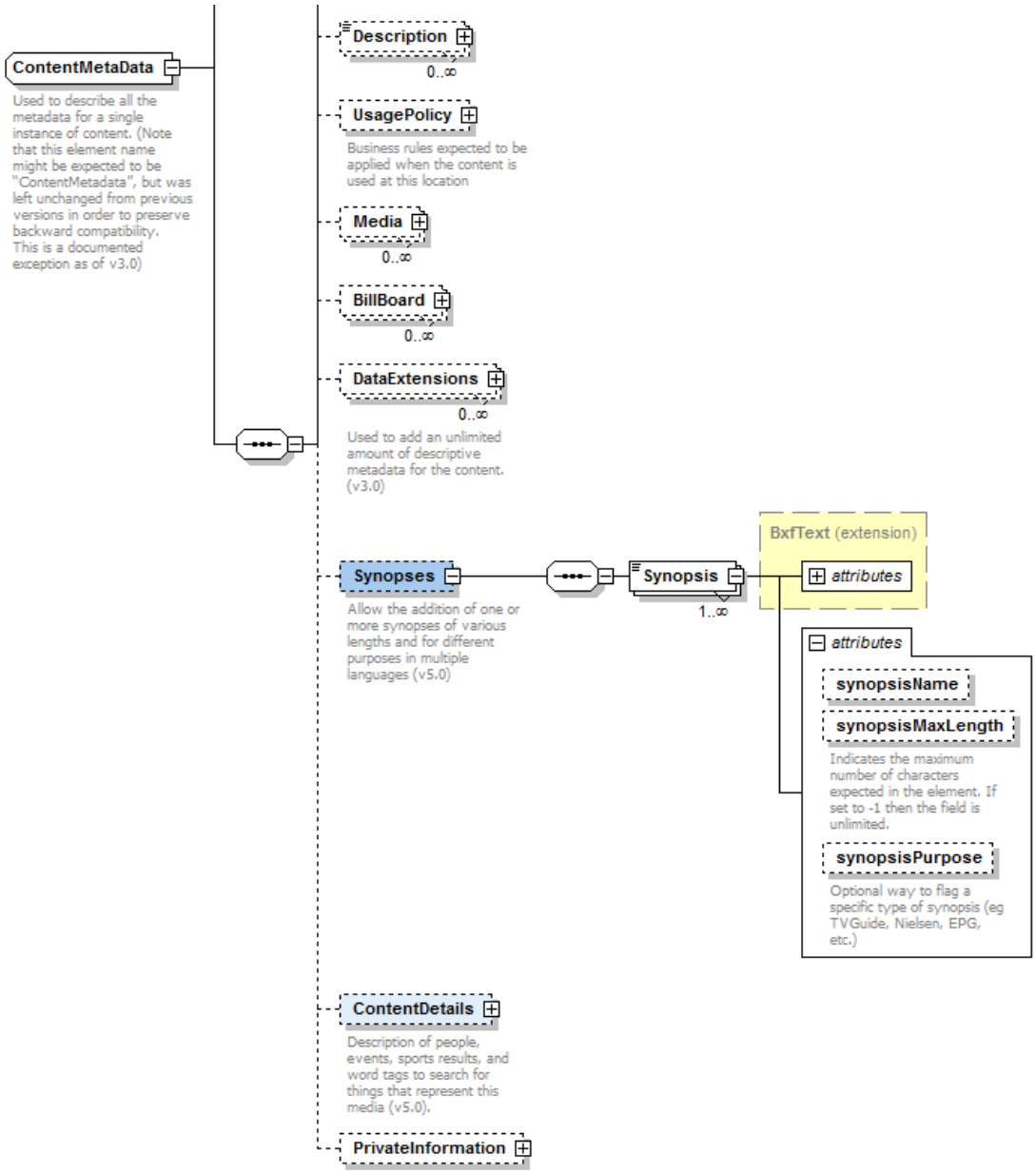
4.1.13.1 BXF 5.0 Changes

Description of change:
Two new elements were added under ContentMetaData to handle multiple Synopses and an expanded ContentDetails complex type. Under Synopses is Synopsis which is unbounded and is based on BxfText plus several extended attributes that allow the assignment of a synopsis name, a maximum length and its purpose. Under ContentDetails is a new element, ContentTags, which is also unbounded and supports keyword tagging, categorization, extended descriptions, the location where the specific tagging would happen on the media, the event date and time, specific details concerning the event, if it is sports related and many other options. Under Media/MediaLocation, QualityControl has been added as a new element and links to the new QualityControl.XSD using a new include statement. See QualityControl.XSD below for more details. Lastly, BaseMedia complex type has a new choice option of ContentDelivery. This links to the new ContentDelivery.XSD using a new include statement. See ContentDelivery (directly above) for more details.

Text representation:

```
<xs:include schemaLocation="qualitycontrol.xsd"/>
<xs:include schemaLocation="contentdelivery.xsd"/>

<xs:element name="Synopses" minOccurs="0">
      <xs:annotation>
      <xs:documentation>Allow the addition of one or more synopses of various lengths and for different
purposes in multiple languages (v5.0)</xs:documentation>
      </xs:annotation>
      <xs:complexType>
            <xs:sequence>
                  <xs:element name="Synopsis" maxOccurs="unbounded">
                        <xs:complexType>
                              <xs:complexContent>
                                    <xs:extension base="BxfText">
                                          <xs:attribute name="synopsisName" type="xs:string"/>
                                          <xs:attribute name="synopsisMaxLength" type="xs:integer">
                                          <xs:annotation>
                                          <xs:documentation>Indicates the maximum number of characters expected in
the element. If set to -1 then the field is unlimited.</xs:documentation>
                                          </xs:annotation>
                                          </xs:attribute>
                                          <xs:attribute name="synopsisPurpose" type="xs:string">
                                          <xs:annotation>
```

```
                                    <xs:documentation>Optional way to flag a specific type of synopsis (eg
TVGuide, Nielsen, EPG, etc.)</xs:documentation>
                                    </xs:annotation>
                                    </xs:attribute>
                                </xs:extension>
                            </xs:complexContent>
                        </xs:complexType>
                    </xs:element>
                </xs:sequence>
            </xs:complexType>
</xs:element>

<xs:element name="ContentDetails" type="ContentDetail" minOccurs="0">
        <xs:annotation>
        <xs:documentation>Description of people, events, sports results, and word tags to search for things that
represent this media (v5.0).</xs:documentation>
        </xs:annotation>
</xs:element>
```

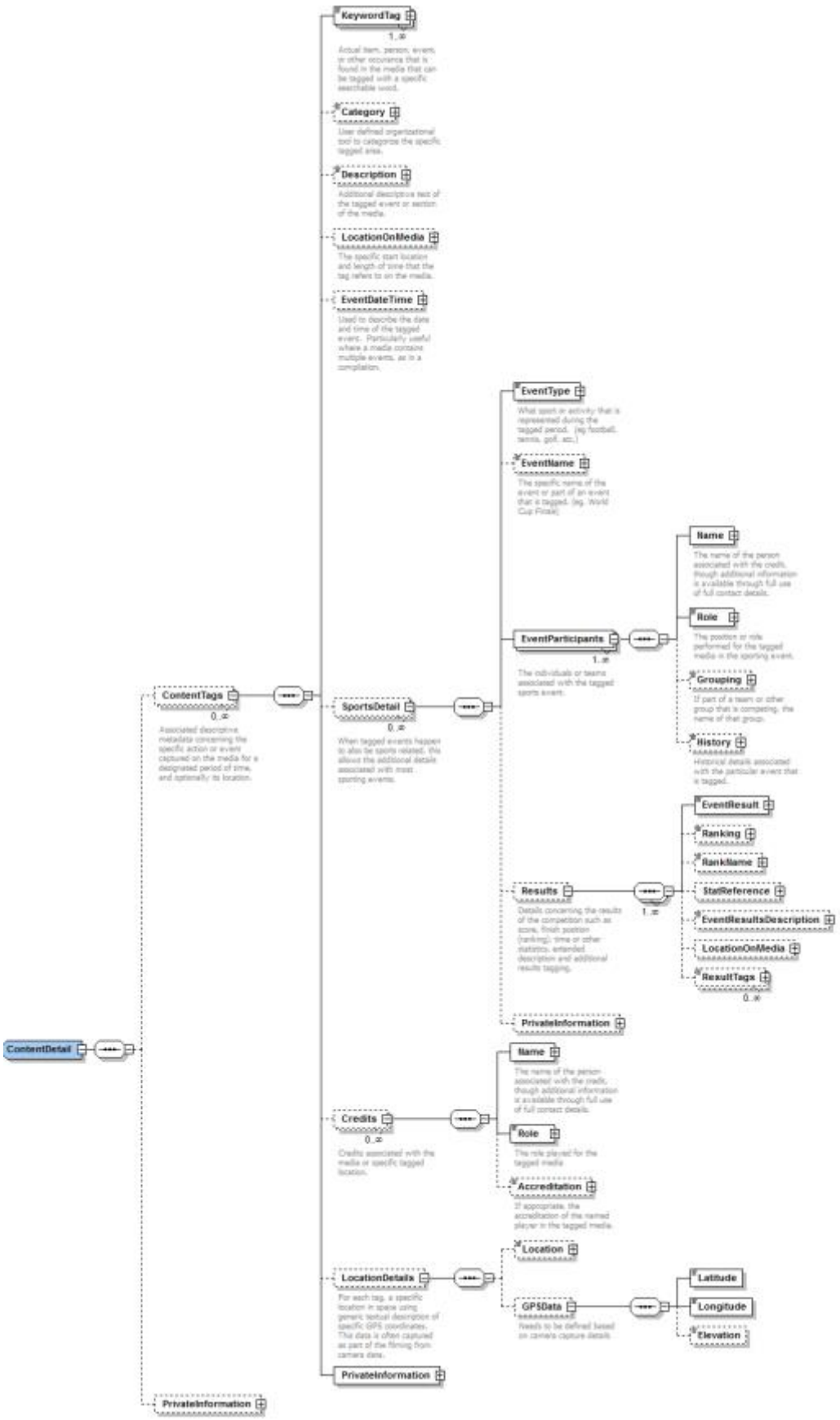


```
<xs:complexType name="ContentDetail">
    <xs:sequence>
        <xs:element name="ContentTags" minOccurs="0" maxOccurs="unbounded">
        <xs:annotation>
        <xs:documentation>Associated descriptive metadata concerning the specific action or event captured on the media for a designated period of time, and optionally its location.</xs:documentation>
        </xs:annotation>
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="KeywordTag" type="BxfText" maxOccurs="unbounded">
                    <xs:annotation>
                    <xs:documentation>Actual item, person, event, or other occurance that is found in the media that can be tagged with a specific searchable word.</xs:documentation>
                    </xs:annotation>
                    </xs:element>
                    <xs:element name="Category" type="BxfText" minOccurs="0">
                    <xs:annotation>
                    <xs:documentation>User defined organizational tool to categorize the specific tagged area.</xs:documentation>
                    </xs:annotation>
                    </xs:element>
                    <xs:element name="Description" type="BxfText" minOccurs="0">
                    <xs:annotation>
                    <xs:documentation>Additional descriptive text of the tagged event or section of the media.</xs:documentation>
                    </xs:annotation>
                    </xs:element>
                    <xs:element name="LocationOnMedia" type="BxfDuration" minOccurs="0">
                    <xs:annotation>
                    <xs:documentation>The specific start location and length of time that the tag refers to on the media.</xs:documentation>
                    </xs:annotation>
                    </xs:element>
                    <xs:element name="EventDateTime" minOccurs="0">
                    <xs:annotation>
                    <xs:documentation>Used to describe the date and time of the tagged event.  Particularly useful where a media contains multiple events, as in a compilation.</xs:documentation>
                    </xs:annotation>
                        <xs:complexType>
                            <xs:complexContent>
                                <xs:extension base="BxfDateTime"/>
                            </xs:complexContent>
                        </xs:complexType>
                    </xs:element>
                    <xs:element name="SportsDetail" minOccurs="0" maxOccurs="unbounded">
                    <xs:annotation>
                    <xs:documentation>When tagged events happen to also be sports related, this allows the additional details associated with most sporting events,</xs:documentation>
                    </xs:annotation>
                        <xs:complexType>
                            <xs:sequence>
                                <xs:element name="EventType" type="BxfText">
                                <xs:annotation>
                                <xs:documentation>What sport or activity that is represented during the tagged period.  (eg football, tennis, golf, etc.)</xs:documentation>
                                </xs:annotation>
                                </xs:element>
                                <xs:element name="EventName" type="BxfText" minOccurs="0">
```

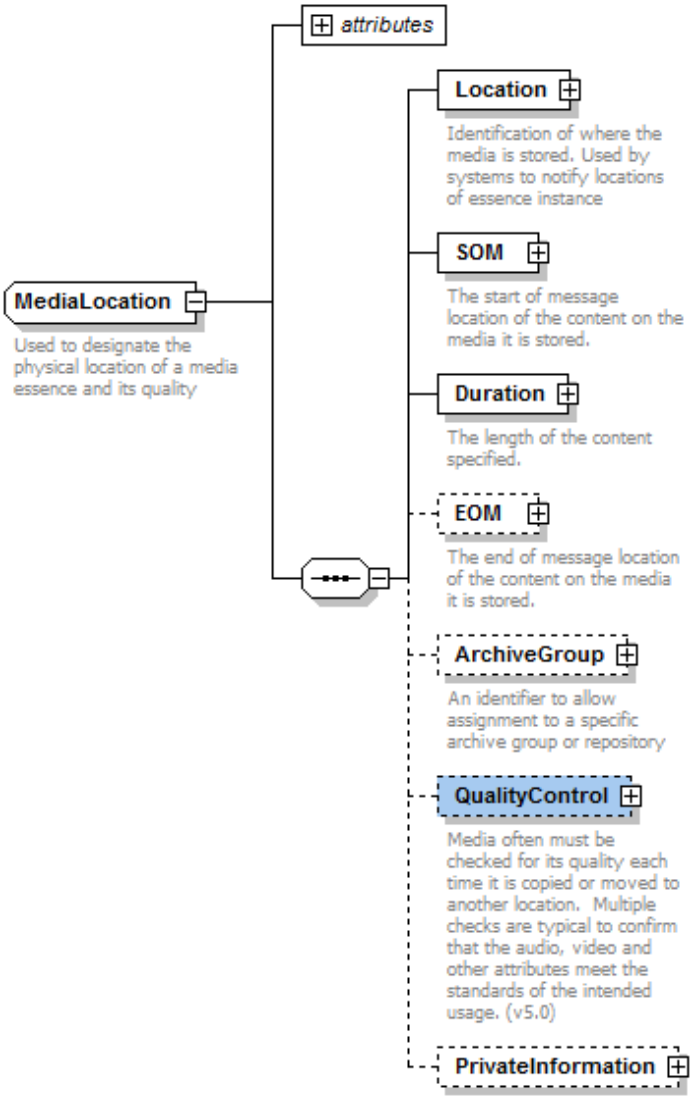
```
                                        <xs:annotation>
                                        <xs:documentation>The specific name of the event or part of an event that
is tagged. (eg. World Cup Finals)</xs:documentation>
                                        </xs:annotation>
                                        </xs:element>
                                        <xs:element name="EventParticipants" maxOccurs="unbounded">
                                        <xs:annotation>
                                        <xs:documentation>The individuals or teams associated with the tagged
sports event.</xs:documentation>
                                        </xs:annotation>
                                            <xs:complexType>
                                                <xs:sequence>
                                                    <xs:element name="Name" type="BxfContact">
                                                    <xs:annotation>
                                                    <xs:documentation>The name of the person associated with
the credit, though additional information is available through full use of full contact details.</xs:documentation>
                                                    </xs:annotation>
                                                    </xs:element>
                                                    <xs:element name="Role" type="BxfText">
                                                    <xs:annotation>
                                                    <xs:documentation>The position or role performed for the
tagged media in the sporting event.</xs:documentation>
                                                    </xs:annotation>
                                                    </xs:element>
                                                    <xs:element name="Grouping" type="BxfText"
minOccurs="0">
                                                    <xs:annotation>
                                                    <xs:documentation>If part of a team or other group that is
competing, the name of that group.</xs:documentation>
                                                    </xs:annotation>
                                                    </xs:element>
                                                    <xs:element name="History" type="BxfText" minOccurs="0">
                                                    <xs:annotation>
                                                    <xs:documentation>Historical details associated with the
particular event that is tagged.</xs:documentation>
                                                    </xs:annotation>
                                                    </xs:element>
                                                </xs:sequence>
                                            </xs:complexType>
                                        </xs:element>
                                        <xs:element name="Results" minOccurs="0">
                                        <xs:annotation>
                                        <xs:documentation>Details concerning the results of the competition such
as score, finish position (ranking), time or other statistics, extended description and additional results
tagging.</xs:documentation>
                                        </xs:annotation>
                                            <xs:complexType>
                                                <xs:sequence maxOccurs="unbounded">
                                                    <xs:element name="EventResult" type="BxfText"/>
                                                    <xs:element name="Ranking" type="BxfText"
minOccurs="0"/>
                                                    <xs:element name="RankName" type="BxfText"
minOccurs="0"/>
                                                    <xs:element name="StatReference" minOccurs="0">
                                                        <xs:complexType>
                                                            <xs:sequence maxOccurs="unbounded">
                                                                <xs:element name="Stat" type="BxfText"
minOccurs="0"/>
```

```
                                                    </xs:sequence>
                                                </xs:complexType>
                                            </xs:element>
                                            <xs:element name="EventResultsDescription" type="BxfText"
minOccurs="0"/>
                                            <xs:element name="LocationOnMedia"
type="BxfSmpteDateTime" minOccurs="0"/>
                                            <xs:element name="ResultTags" type="BxfText"
minOccurs="0" maxOccurs="unbounded"/>
                                        </xs:sequence>
                                    </xs:complexType>
                                </xs:element>
                                <xs:element name="PrivateInformation" type="BxfPrivateInformation"
minOccurs="0"/>
                            </xs:sequence>
                        </xs:complexType>
                    </xs:element>
                    <xs:element name="Credits" minOccurs="0" maxOccurs="unbounded">
                    <xs:annotation>
                    <xs:documentation>Credits associated with the media or specific tagged
location.</xs:documentation>
                    </xs:annotation>
                        <xs:complexType>
                            <xs:sequence>
                                <xs:element name="Name" type="BxfContact">
                                <xs:annotation>
                                <xs:documentation>The name of the person associated with the credit,
though additional information is available through full use of full contact details.</xs:documentation>
                                </xs:annotation>
                                </xs:element>
                                <xs:element name="Role" type="BxfText">
                                <xs:annotation>
                                <xs:documentation>The role played for the tagged
media</xs:documentation>
                                </xs:annotation>
                                </xs:element>
                                <xs:element name="Accreditation" type="BxfText" minOccurs="0">
                                <xs:annotation>
                                <xs:documentation>If appropriate, the accreditation of the named player in
the tagged media.</xs:documentation>
                                </xs:annotation>
                                </xs:element>
                            </xs:sequence>
                        </xs:complexType>
                    </xs:element>
                    <xs:element name="LocationDetails" minOccurs="0">
                    <xs:annotation>
                    <xs:documentation>For each tag, a speciific location in space using generic textual
description of specific GPS coordinates.  This data is often captured as part of the filming from camera
data.</xs:documentation>
                    </xs:annotation>
                        <xs:complexType>
                            <xs:sequence>
                                <xs:element name="Location" type="BxfText" minOccurs="0"/>
                                <xs:element name="GPSData" minOccurs="0">
                                <xs:annotation>
                                <xs:documentation>Needs to be defined based on camera capture
details</xs:documentation>
```

```
                                        </xs:annotation>
                                            <xs:complexType>
                                                <xs:sequence>
                                                    <xs:element name="Latitude" type="xs:decimal"/>
                                                    <xs:element name="Longitude" type="xs:decimal"/>
                                                    <xs:element name="Elevation" type="xs:decimal"
minOccurs="0"/>
                                                </xs:sequence>
                                            </xs:complexType>
                                        </xs:element>
                                    </xs:sequence>
                                </xs:complexType>
                            </xs:element>
                            <xs:element name="PrivateInformation" type="BxfPrivateInformation"/>
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
                <xs:element name="PrivateInformation" type="BxfPrivateInformation" minOccurs="0"/>
            </xs:sequence>
</xs:complexType>
```

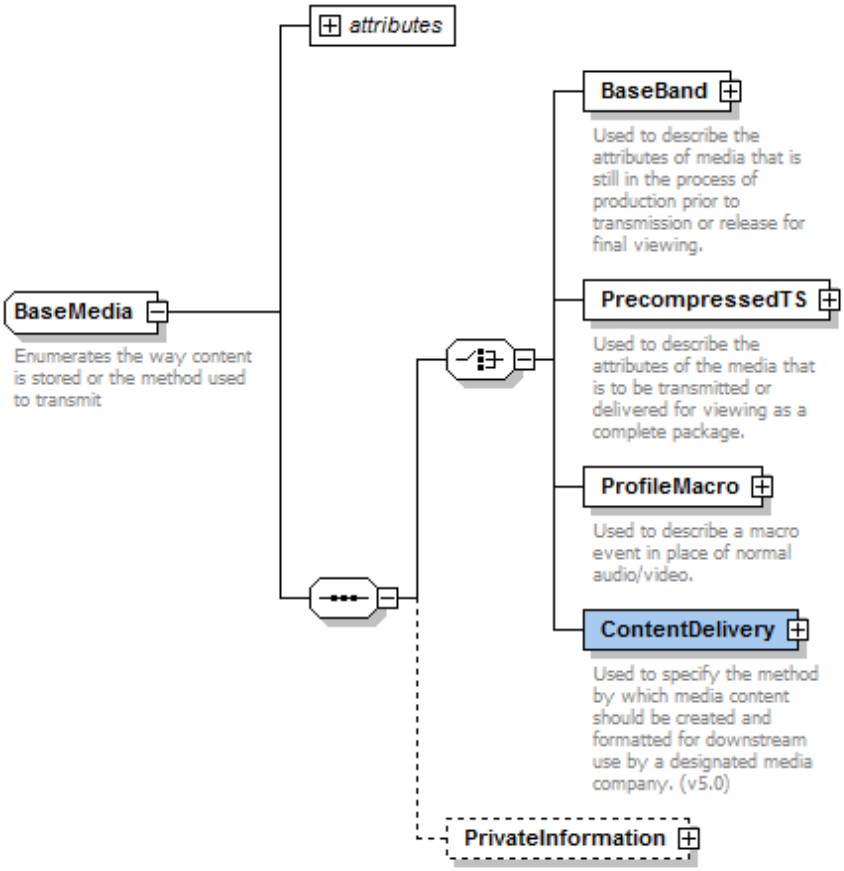


```
<xs:element name="QualityControl" type="QualityControl" minOccurs="0">
      <xs:annotation>
      <xs:documentation>Media often must be checked for its quality each time it is copied or moved to another location.  Multiple checks are typical to confirm that the audio, video and other attributes meet the standards of the intended usage. (v5.0)</xs:documentation>
      </xs:annotation>
</xs:element>
```



See QualityControl.XSD below for details on this new element.

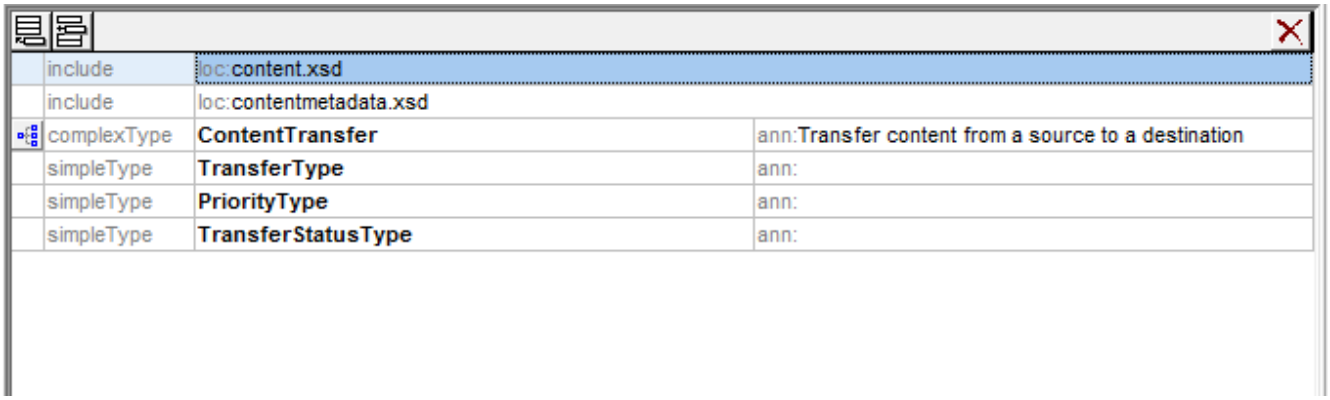
```
<xs:element name="ContentDelivery" type="ContentDelivery">

      <xs:annotation>
            <xs:documentation>Used to specify the method by which media content is to be created and formatted for downstream use by a designated media company. (v5.0)</xs:documentation>
      </xs:annotation>
</xs:element>
```



See ContentDelivery.XSD above for details on this new element.

4.1.14 ContentTransfer.XSD

Contains:

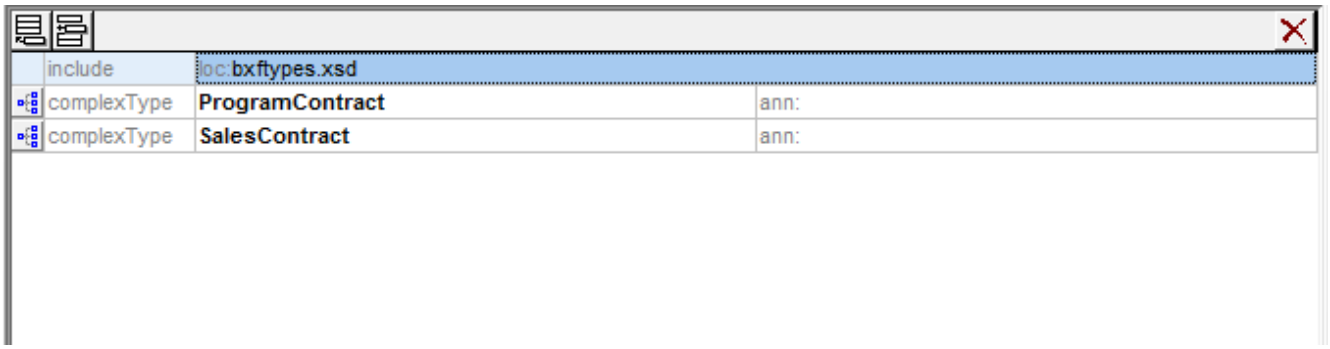


include	loc:content.xsd	
include	loc:contentmetadata.xsd	
complexType	**ContentTransfer**	ann:Transfer content from a source to a destination
simpleType	**TransferType**	ann:
simpleType	**PriorityType**	ann:
simpleType	**TransferStatusType**	ann:

Used to transfer media from one location to another location, or to transcode it.

4.1.15 Contract.XSD

Contains:

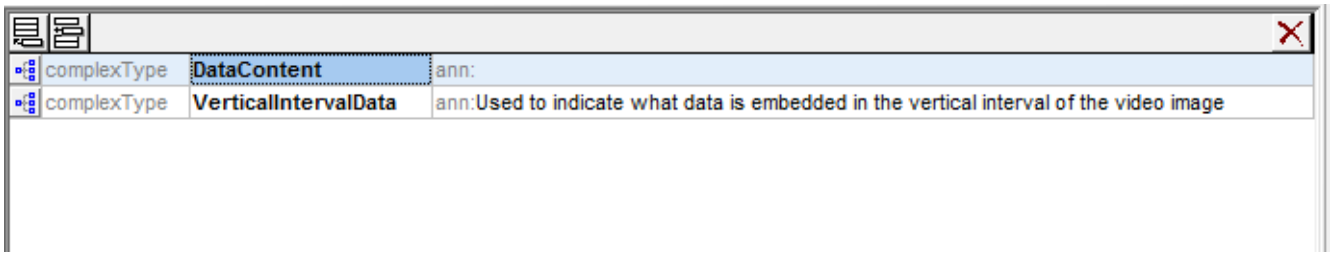


include	loc:bxftypes.xsd	
complexType	**ProgramContract**	ann:
complexType	**SalesContract**	ann:

ProgramContract - used if the program is purchased, it can be linked to a rights contract. SalesContract – used for contract information for the interstitial content (commercials).

4.1.16 DataContent.XSD

Contains:

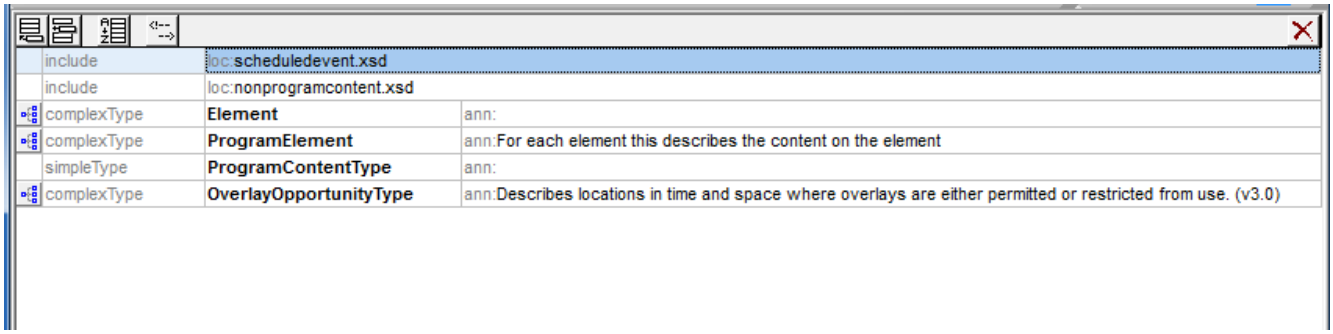


complexType	**DataContent**	ann:
complexType	**VerticalIntervalData**	ann:Used to indicate what data is embedded in the vertical interval of the video image

Used to define data that can be added to the transport stream.

4.1.17 Element.XSD

Contains:

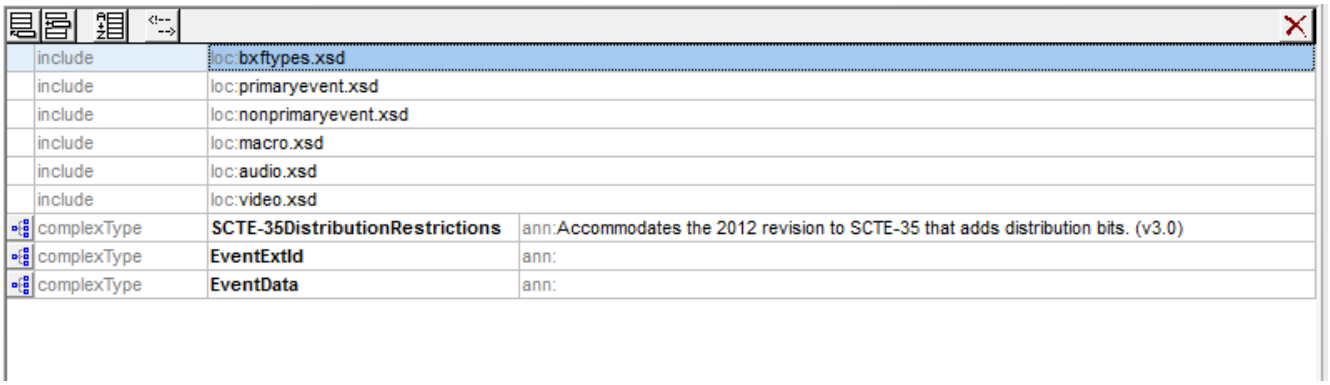


include	loc:scheduledevent.xsd		
include	loc:nonprogramcontent.xsd		
complexType	**Element**	ann:	
complexType	**ProgramElement**	ann:For each element this describes the content on the element	
simpleType	**ProgramContentType**	ann:	
complexType	**OverlayOpportunityType**	ann:Describes locations in time and space where overlays are either permitted or restricted from use. (v3.0)	

If the program is being delivered in segmented form, this describes each segment's content, position and offset from the start of the program as well as other embedded content such as inserted barter content.

4.1.18 EventData.XSD

Contains:

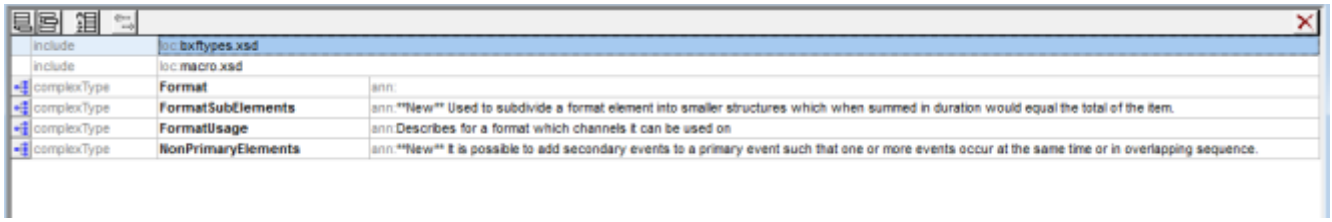


include	loc:bxftypes.xsd		
include	loc:primaryevent.xsd		
include	loc:nonprimaryevent.xsd		
include	loc:macro.xsd		
include	loc:audio.xsd		
include	loc:video.xsd		
complexType	**SCTE-35DistributionRestrictions**	ann:Accommodates the 2012 revision to SCTE-35 that adds distribution bits. (v3.0)	
complexType	**EventExtId**	ann:	
complexType	**EventData**	ann:	

Specifies the data specific to a particular airing of a complete show or a single event. In Version 2, support for multiple titles and descriptions in a single message has been added in order to allow multi-language support.

4.1.19 Format.XSD

Contains:

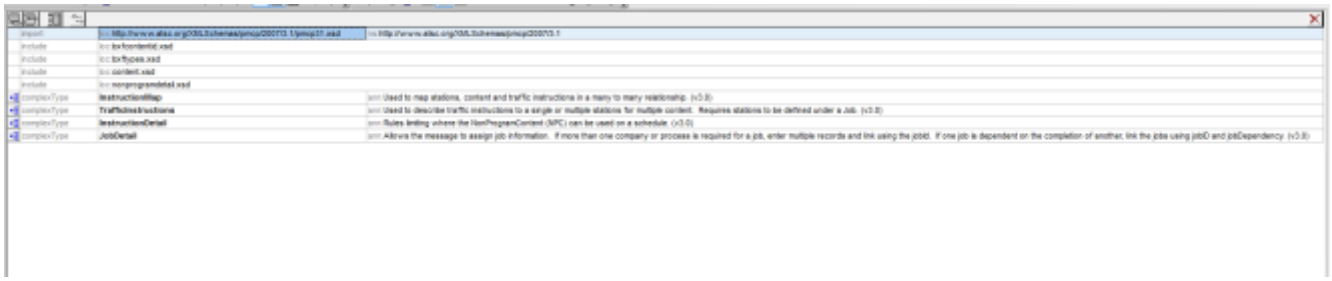


include	loc:bxftypes.xsd		
include	loc:macro.xsd		
complexType	**Format**	ann:	
complexType	**FormatSubElements**	ann:**New** Used to subdivide a format element into smaller structures which when summed in duration would equal the total of the item.	
complexType	**FormatUsage**	ann:Describes for a format which channels it can be used on	
complexType	**NonPrimaryElements**	ann:**New** It is possible to add secondary events to a primary event such that one or more events occur at the same time or in overlapping sequence.	

The definition of the skeletal structure of a program as used by the traffic system to construct a schedule grid.

4.1.20 JobDetail.XSD

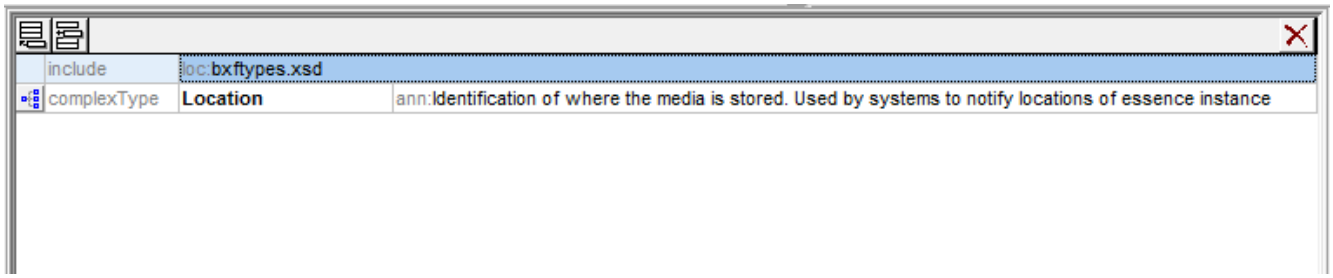
Contains:



Allows the message to assign job information. If more than one company or process is required for a job, enter multiple records and link using the jobId. If one job is dependent on the completion of another, link the jobs using jobID and jobDependency.

4.1.21 Location.XSD

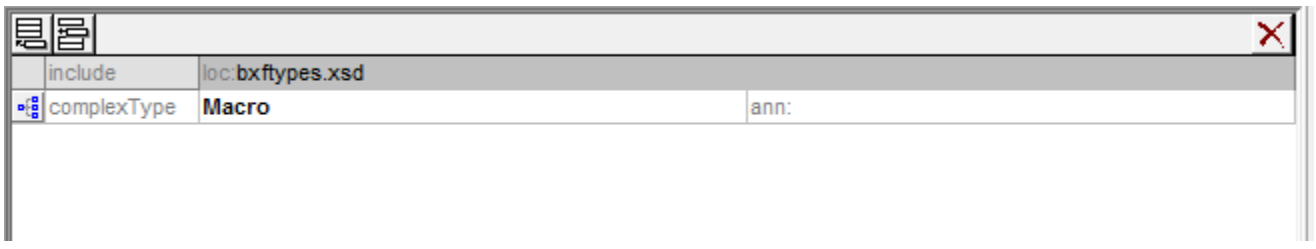
Contains:



Identification of where the media is stored. Used by systems to notify locations of content.

4.1.22 Macro.XSD

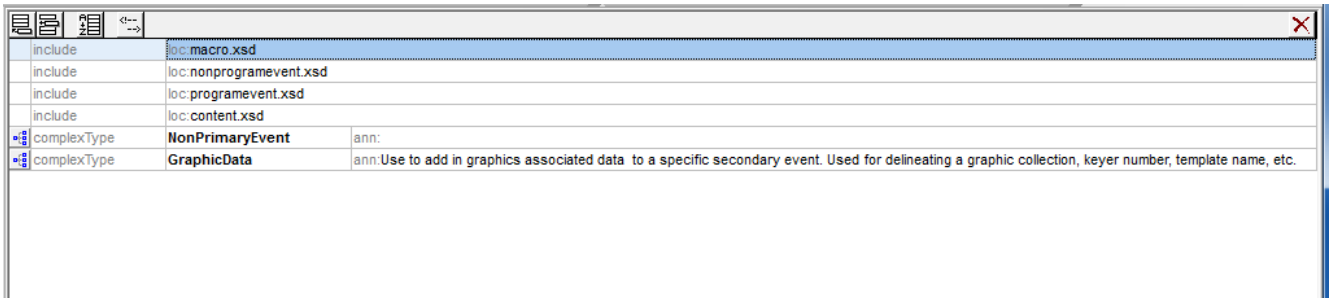
Contains:



Used to describe a MacroEvent under EventData.

4.1.23 NonPrimaryEvent.XSD

Contains:



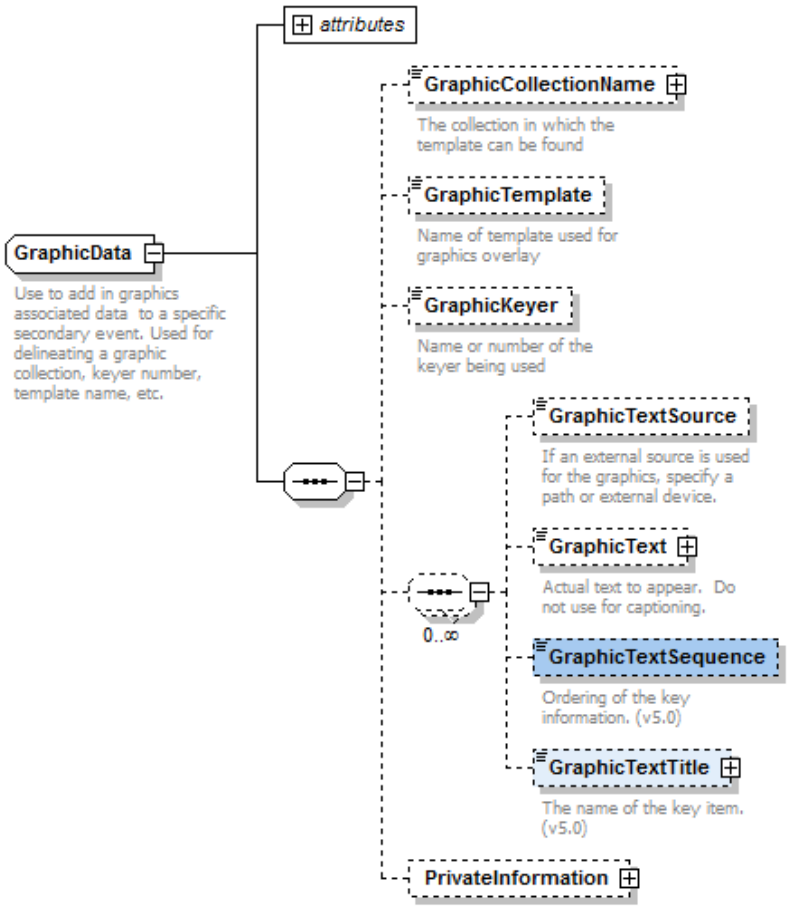
Used to describe those events that are not the primary content of a transport stream or playlist. Secondary events happen at the same time or in conjunction with the broadcast of the primary video and audio streams and can be started and completed using offsets from the start of the primary events. Note that in Version 2, BXF supports the inclusion of program events referenced by the secondary event.

4.1.23.1 BXF 5.0 Changes

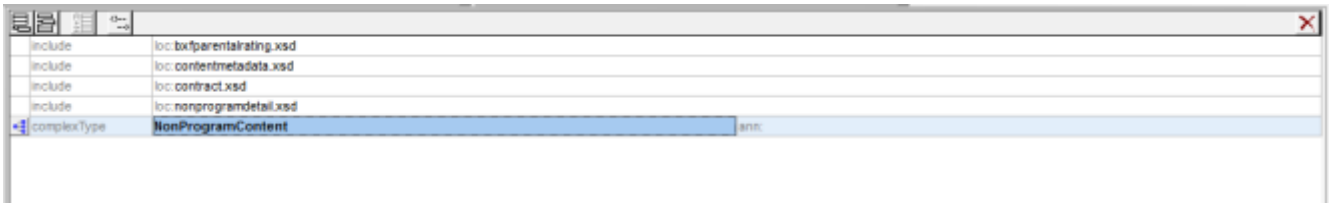
Description of change:
The complex type, GraphicData added two new elements, GraphicTextSequence and GraphicTextTitle to further enhance the functionality of managing secondary events and their graphic components.

Text representation:

```
<xs:element name="GraphicTextSequence" type="xs:positiveInteger" minOccurs="0">
      <xs:annotation>
            <xs:documentation>Ordering of the key information. (v5.0)</xs:documentation>
      </xs:annotation>
</xs:element>

<xs:element name="GraphicTextTitle" type="BxfText" minOccurs="0">
      <xs:annotation>
            <xs:documentation>The name of the key item. (v5.0)</xs:documentation>
      </xs:annotation>
</xs:element>
```



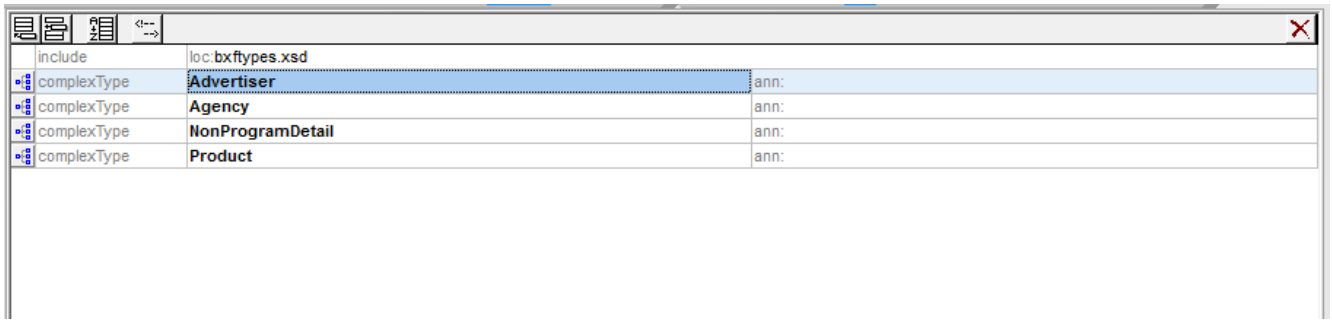
4.1.24 NonProgramContent.XSD



Non-program content typically describes short form content such as commercials, psa's, id's and other events that are not considered full length program content.

4.1.25 NonProgramDetail.XSD

Contains:



Details of the non-program content.

4.1.25.1 BXF 5.0 Changes

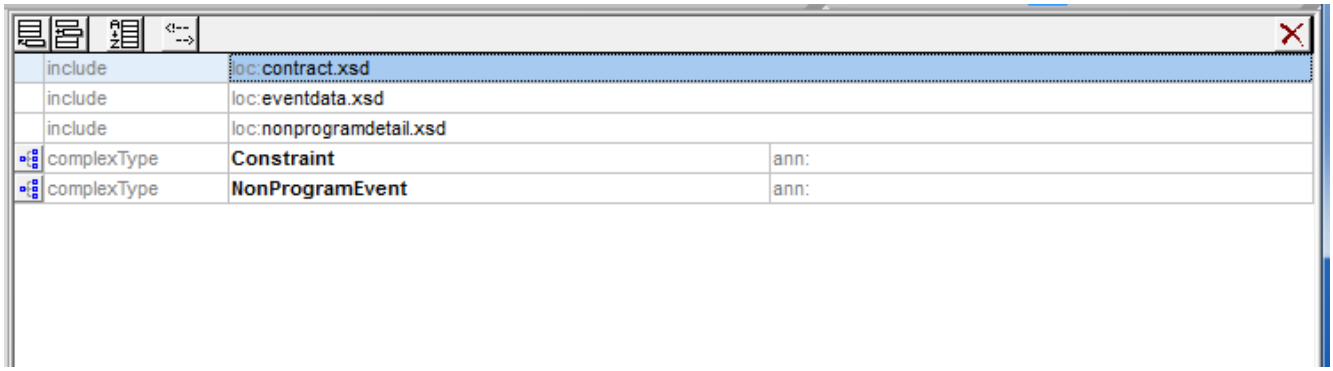
Description of change:
Paid Program was added as a new enumeration option for both AdType and SpotType,

Text representation:

```
<xs:element name="AdType">
    <xs:annotation>
        <xs:documentation>Used to describe the type of advertisement being placed (e.g. General, Promo, PSA, etc.) Default is General. (v5.0)</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Direct Response"/>
            <xs:enumeration value="General"/>
            <xs:enumeration value="Paid Program"/>
            <xs:enumeration value="Promo"/>
            <xs:enumeration value="PSA"/>
            <xs:enumeration value="Trade/Barter"/>
            <xs:enumeration value="Other"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="SpotType" default="Standard">
    <xs:annotation>
        <xs:documentation>Used to describe the type of spot or other interstitial (e.g. Standard, BillBoard, Bookend, etc.)  Default is Standard. (v5.0)</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="BillBoard"/>
            <xs:enumeration value="Bookend"/>
            <xs:enumeration value="Paid Program"/>
            <xs:enumeration value="Piggyback"/>
            <xs:enumeration value="Standard"/>
            <xs:enumeration value="Other"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
```

4.1.26 NonProgramEvent.XSD

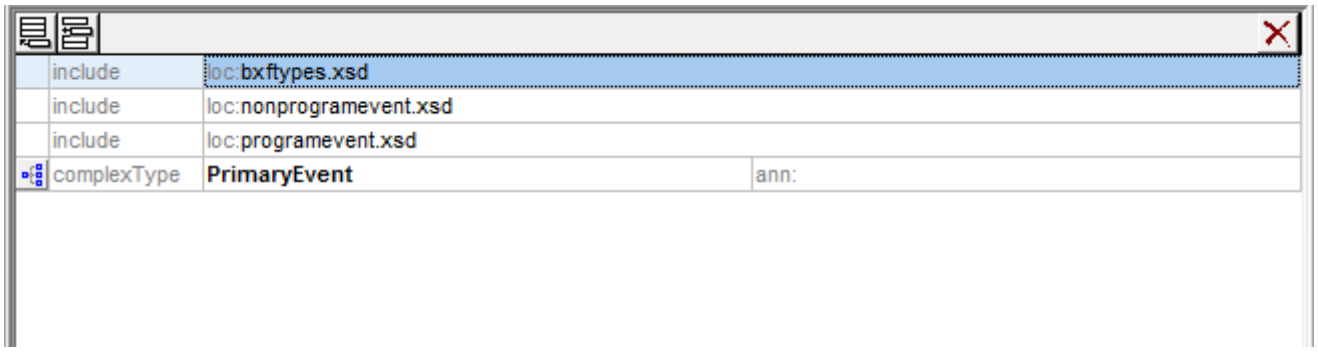
Contains:



Describes an event that contains NonProgramContent such as commercials and other interstitials, typically of short duration.

4.1.27 PrimaryEvent.XSD

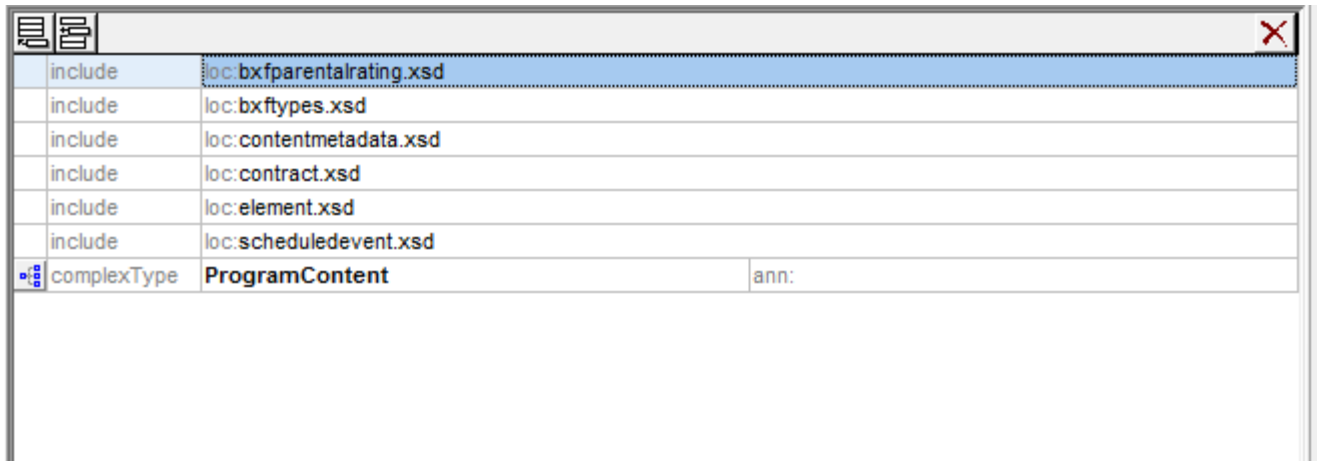
Contains:



Describes an event that contains the primary audio and video content for the transport stream or playlist.

4.1.28 ProgramContent.XSD

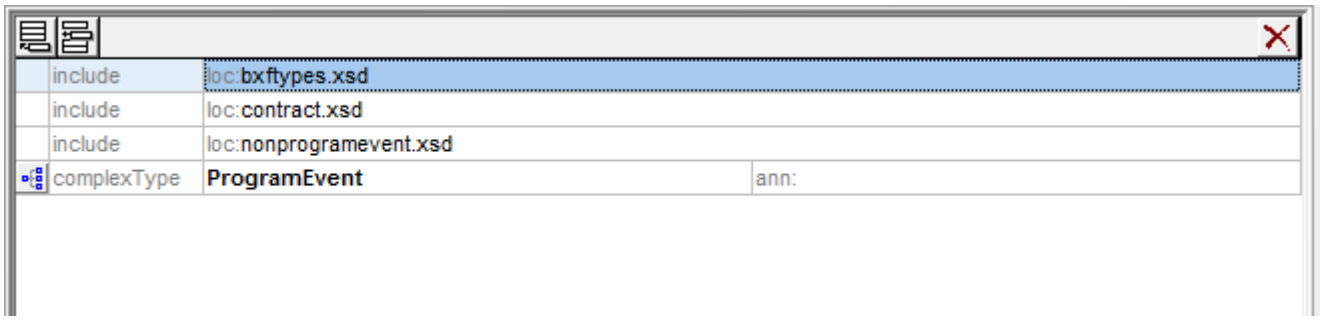
Contains:



Used to describe the full length content of a show.

4.1.29 ProgramEvent.XSD

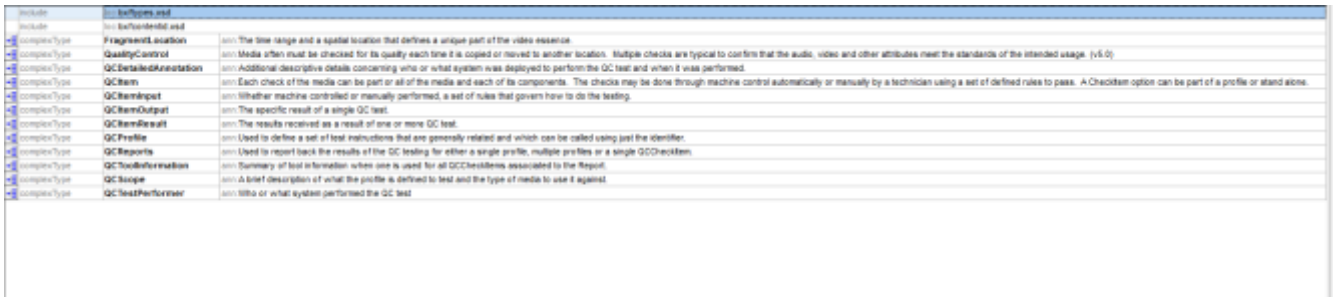
Contains:



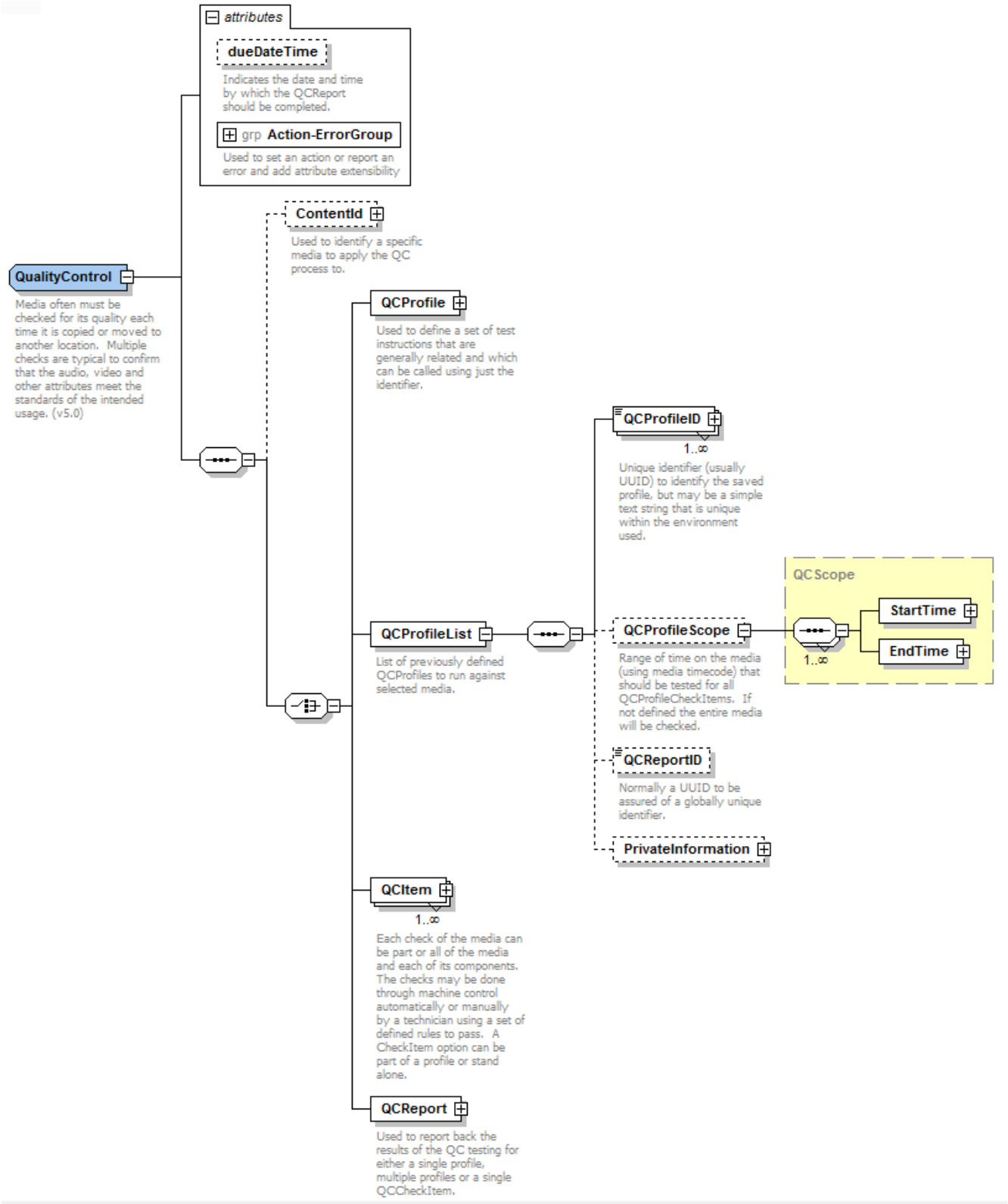
Describes an event that contains ProgramContent.

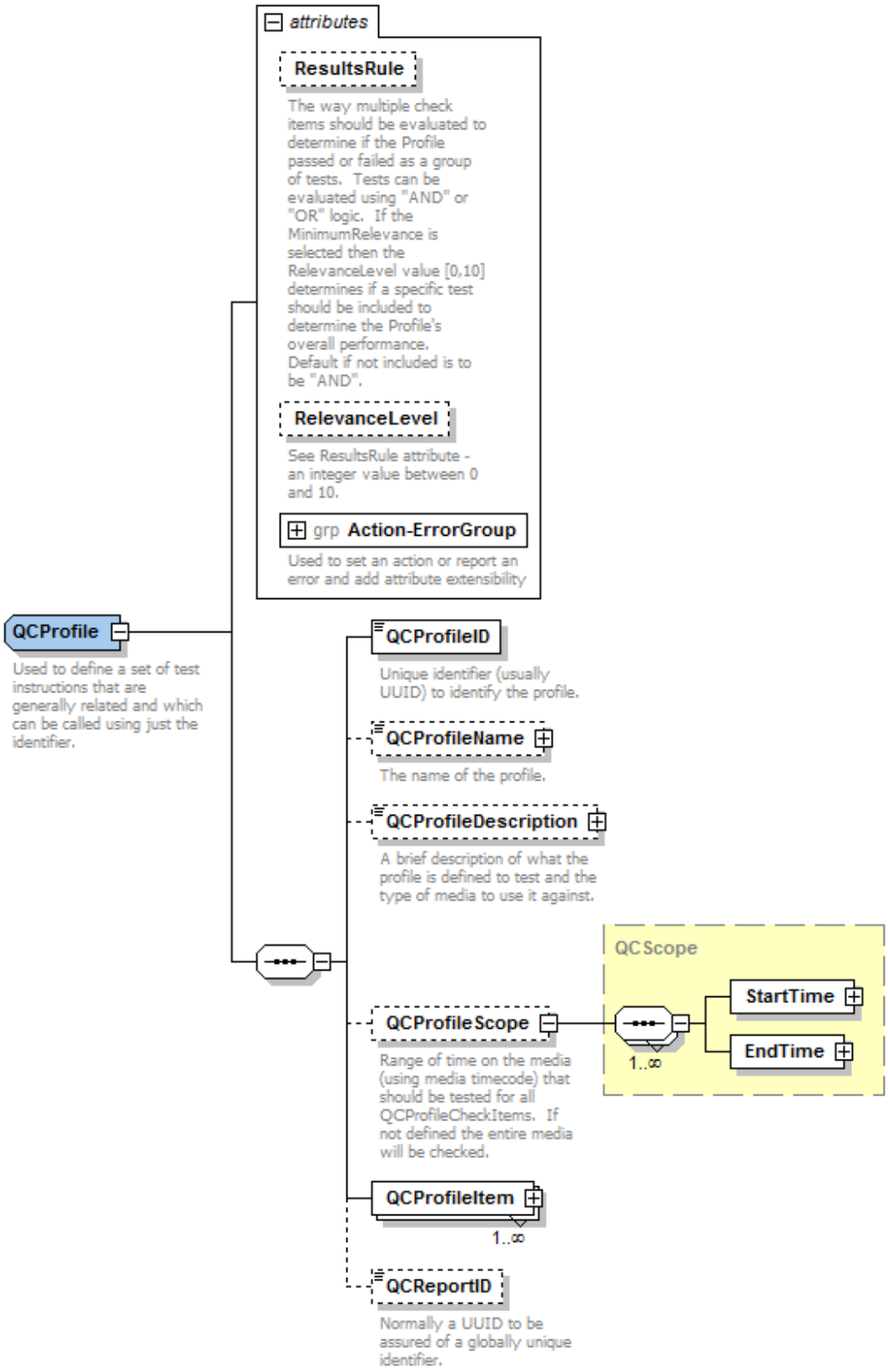
4.1.30 QualityControl.XSD **New**

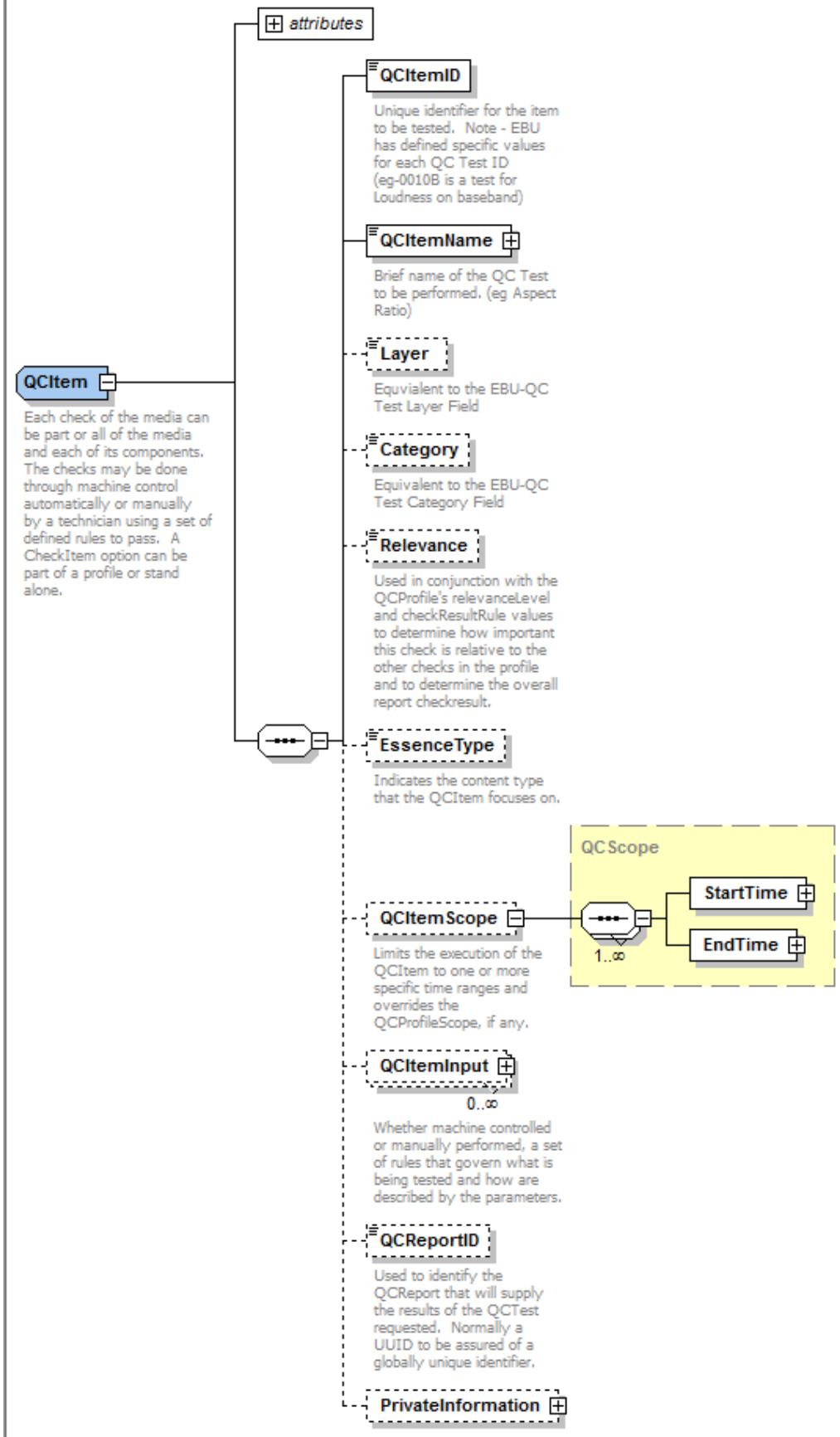
Contains:

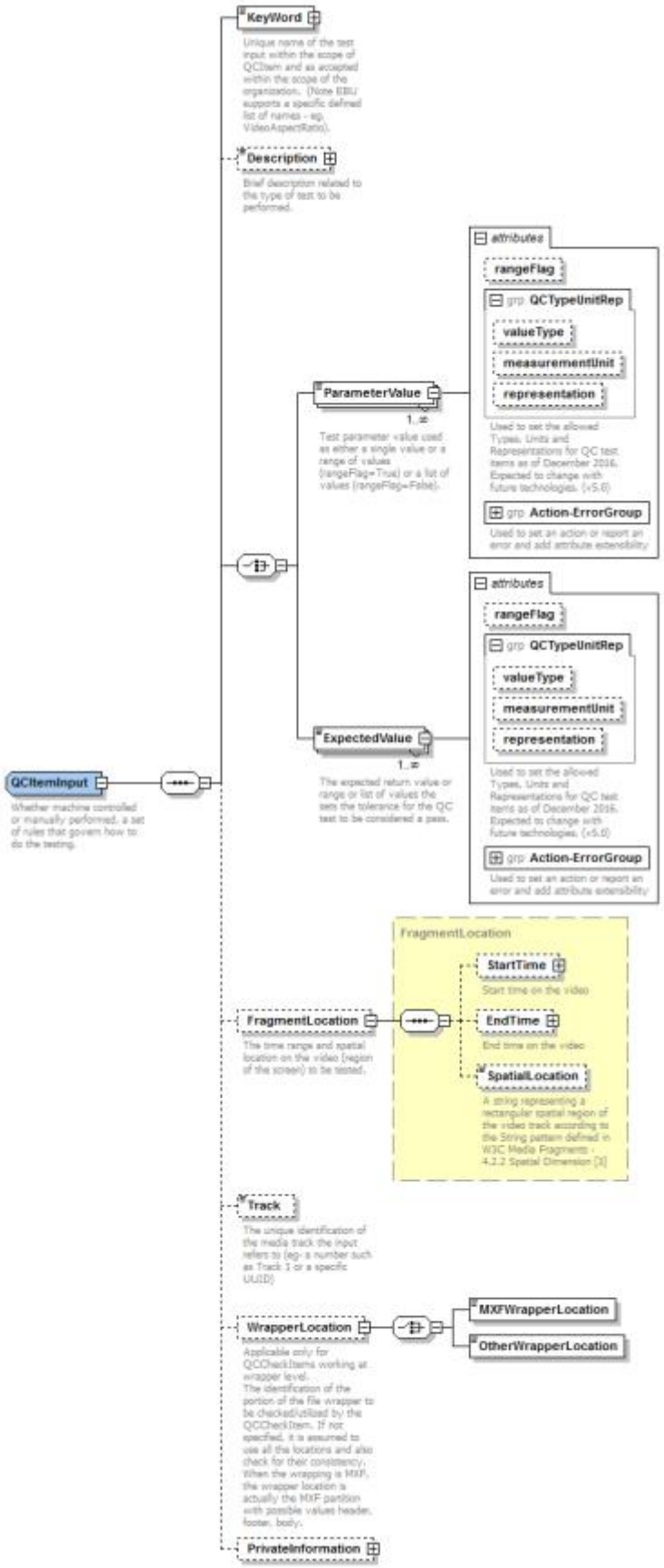


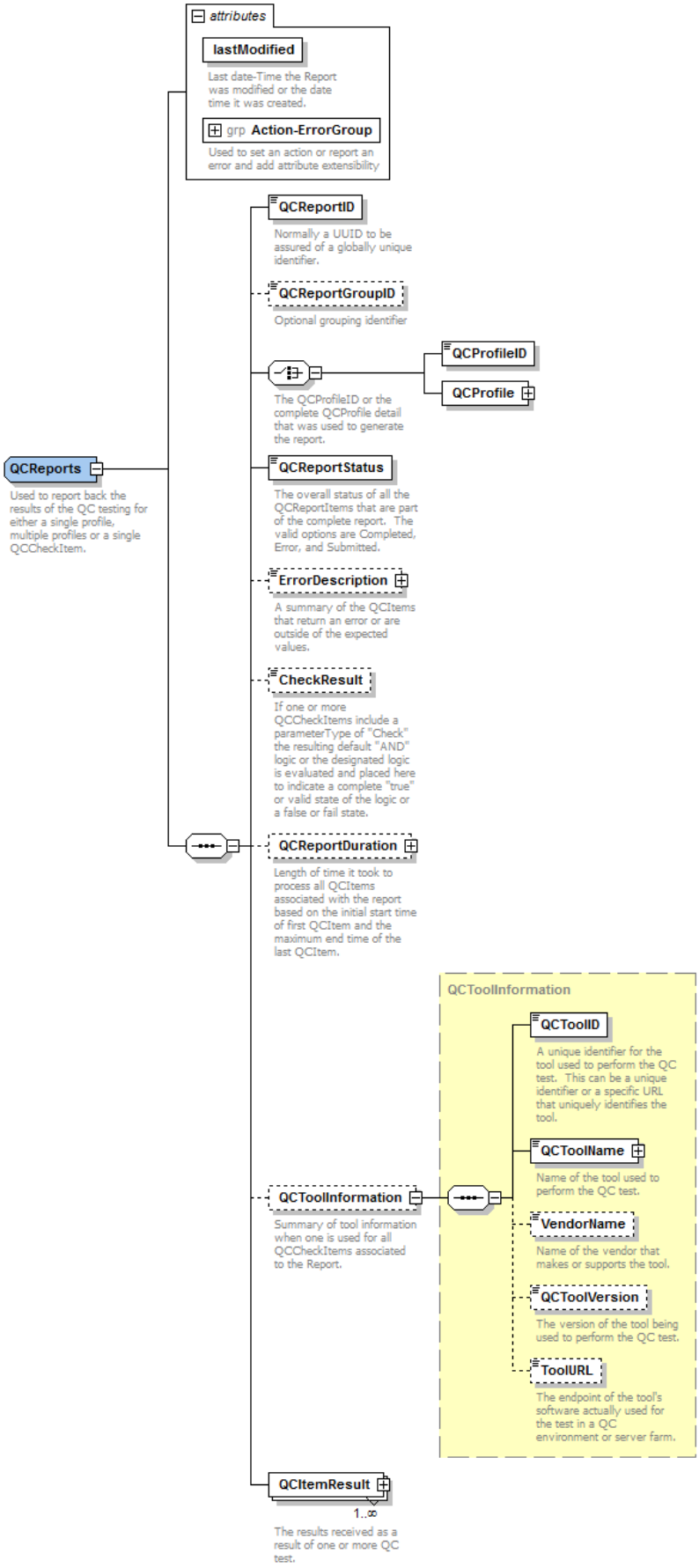
Media often must be checked for its quality each time it is copied or moved to another location. Multiple checks are typical to confirm that the audio, video and other attributes meet the standards of the intended usage. QualityControl is accessible at the top choice level of BxfData in order to allow the creation of specific profiles without regard to specific media being tested. It is also found under Media/MediaLocation as an element that allows for the selection and reporting back on a specific media at a specific location. The text is not included due to its length, but can be viewed as part of the overall XSD structure provided as part of this package. The schema is setup as several complex types with the top level shown below:

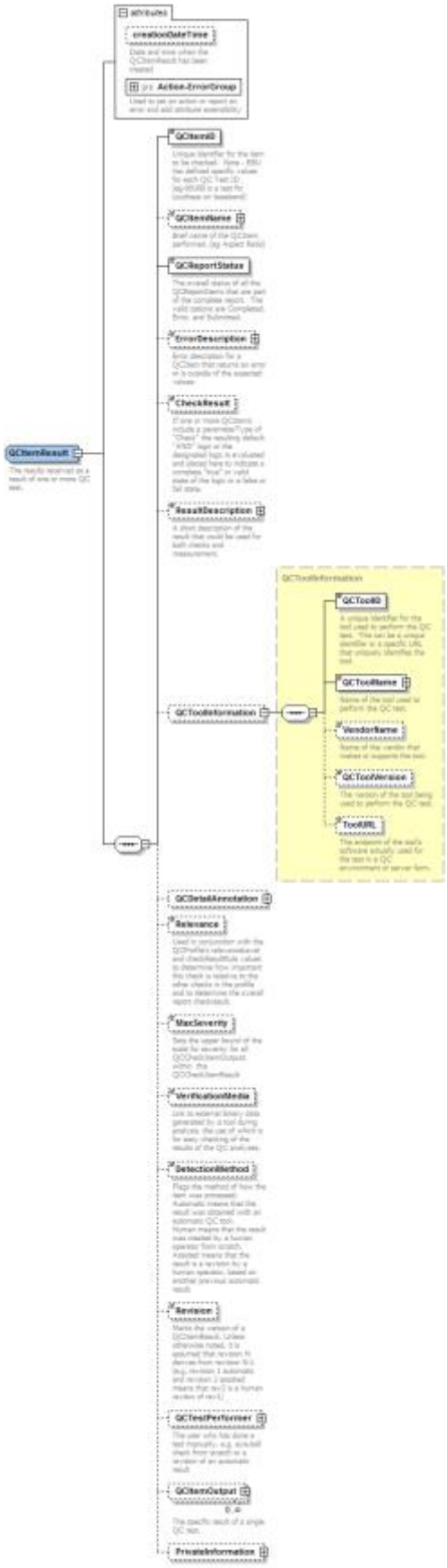


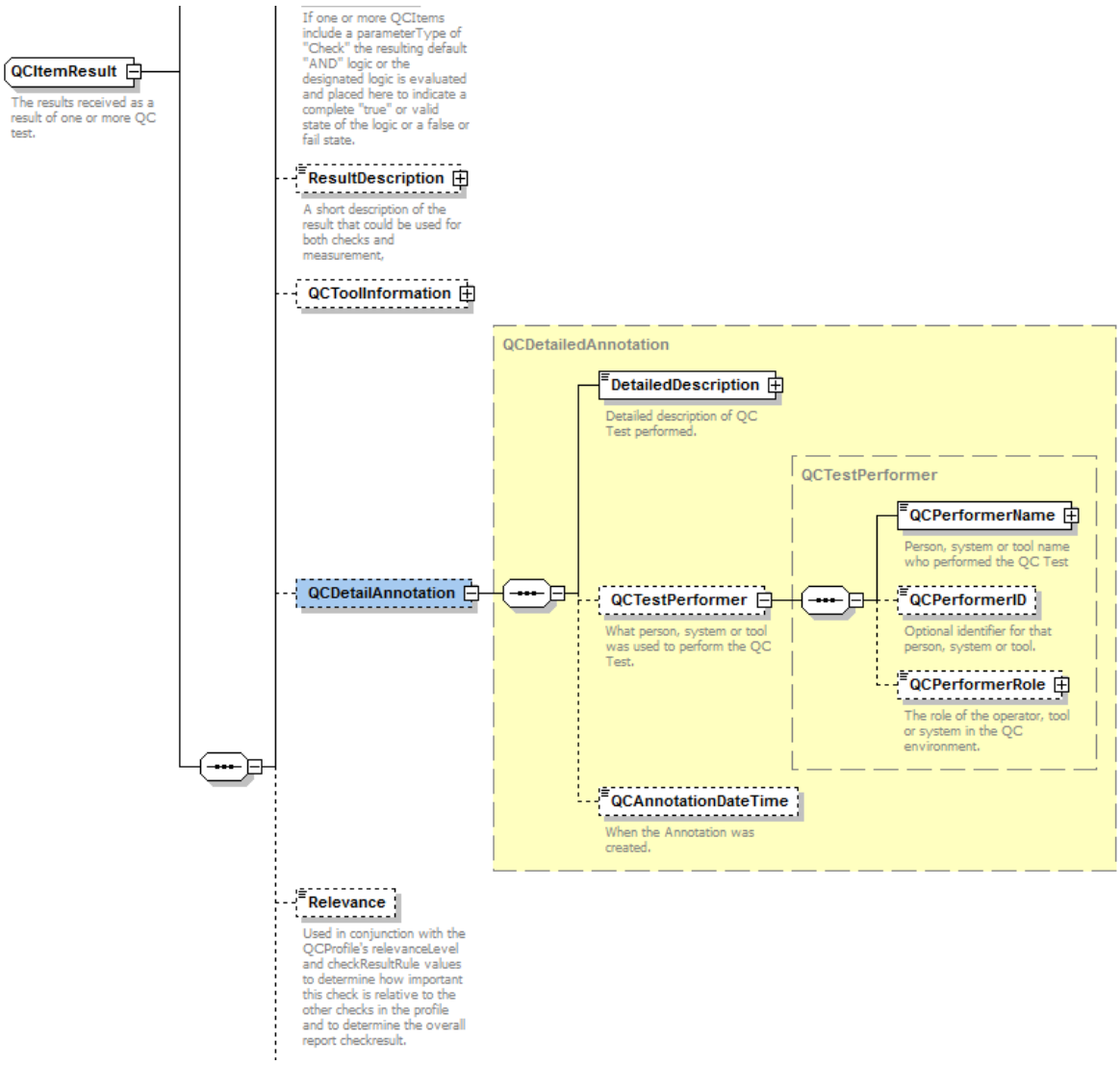


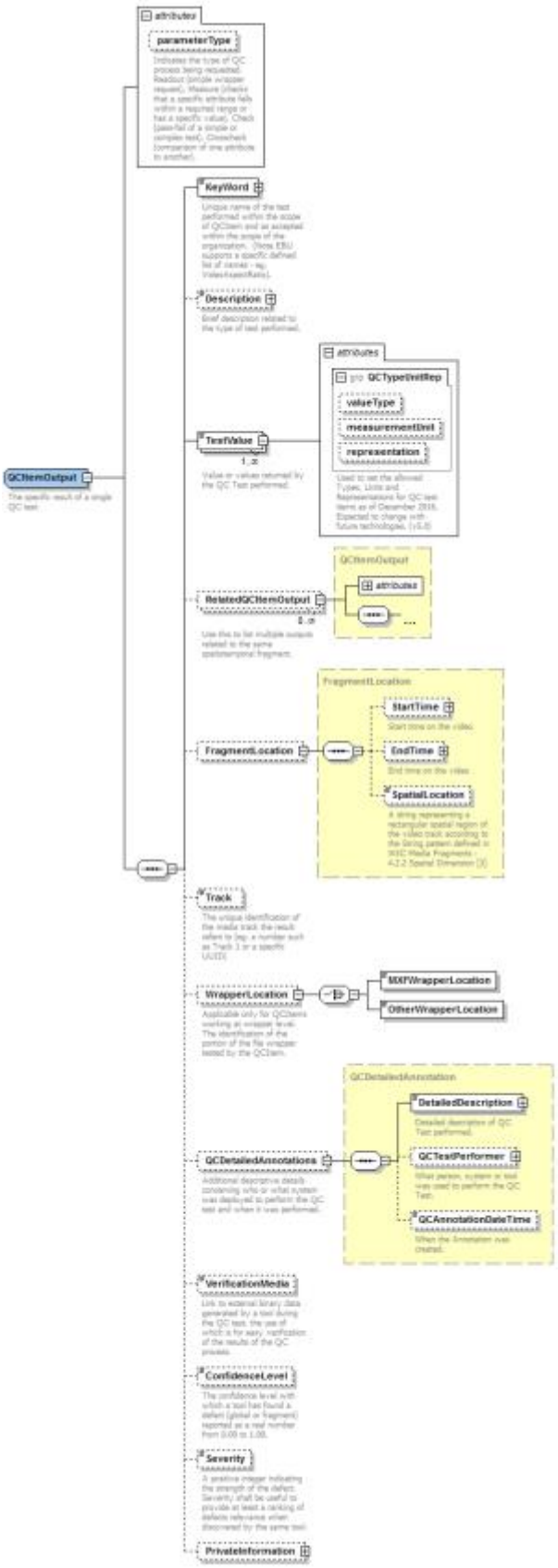






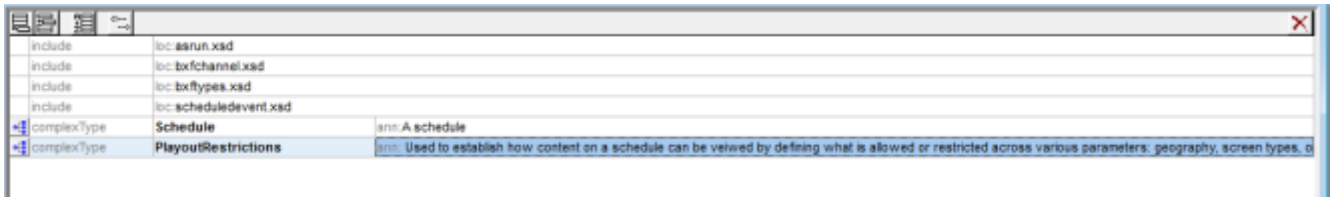






4.1.31 Schedule.XSD

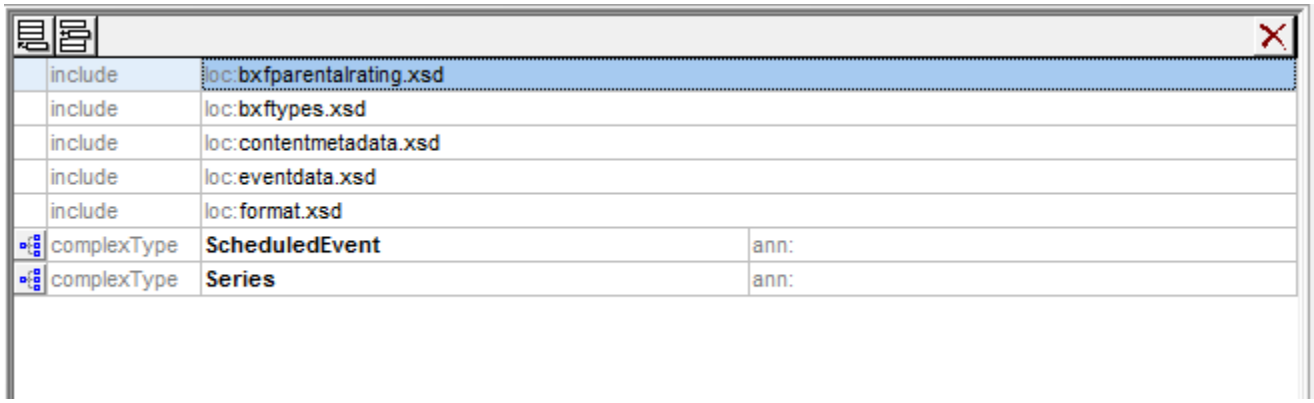
Contains:



Used to describe a specific list of content in a linear playout sequence. In Version 2, support has been added to communicate schedule changes in real time by a new node, RealTimeDetail. This allows the indication of which event is the current event playing as well as the events that had played out previously and those that will playout next.

4.1.32 ScheduledEvent.XSD

Contains:



Used to describe a single event within a specific list of content arranged in a linear playout sequence.

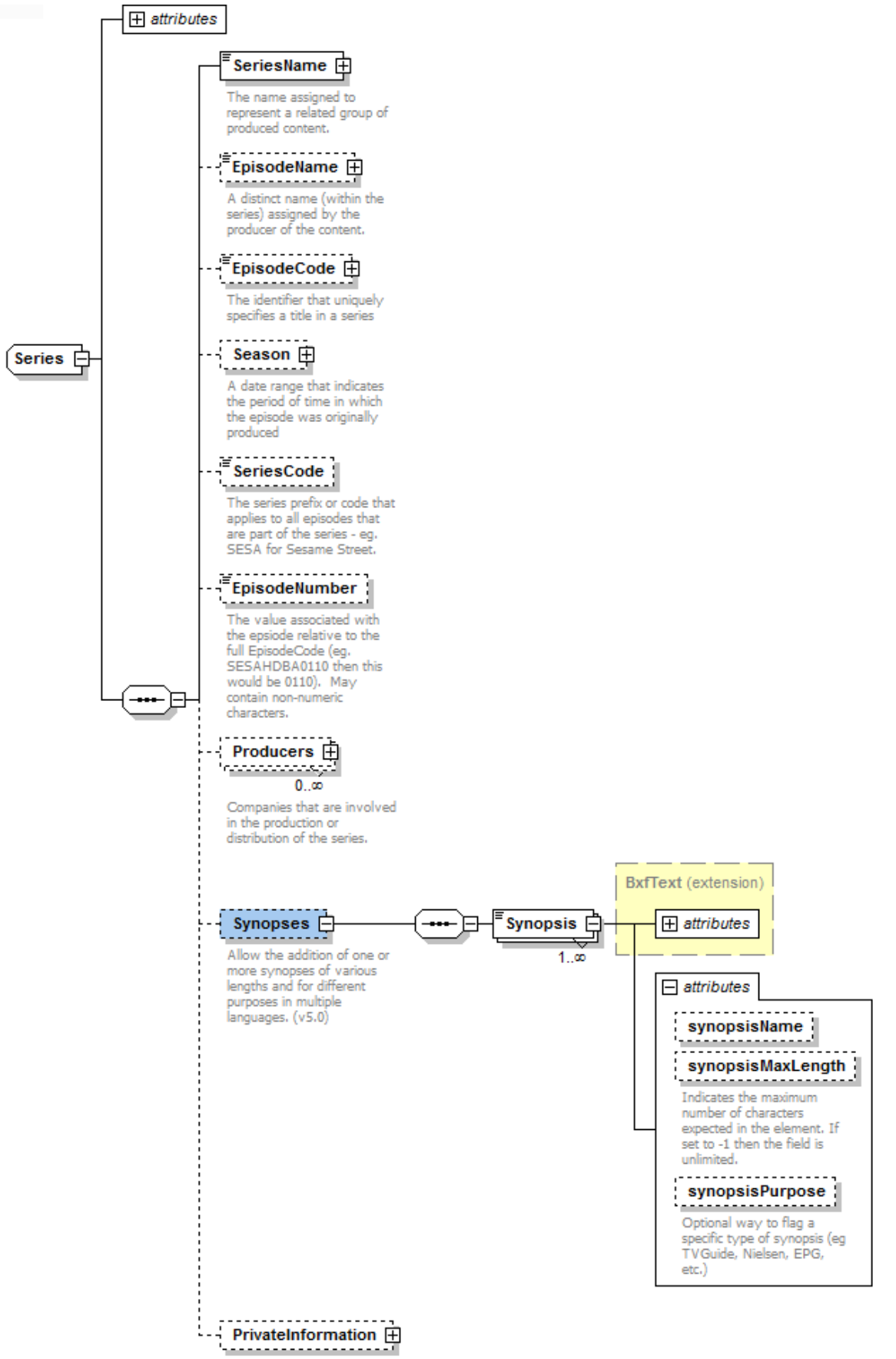
4.1.32.1 BXF 5.0 Changes

Description of change:
Under Series, Synopses was added as a new element with the same structure as detailed in ContentMetaData.

Text representation:

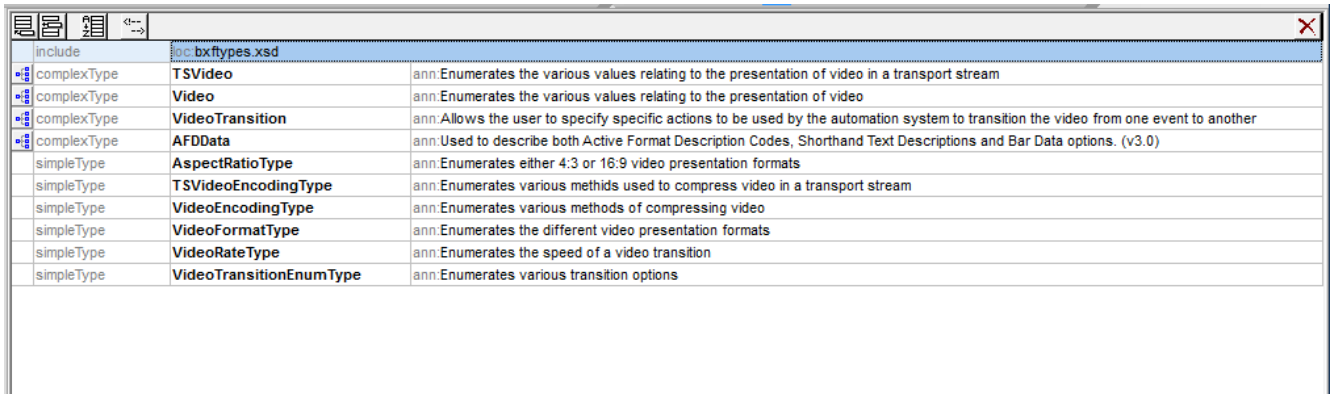
```
<xs:element name="Synopses" minOccurs="0">
    <xs:annotation>
        <xs:documentation>Allow the addition of one or more synopses of various lengths and for different purposes in multiple languages. (v5.0)</xs:documentation>
    </xs:annotation>
    <xs:complexType>
        <xs:sequence>
            <xs:element name="Synopsis" maxOccurs="unbounded">
                <xs:complexType>
                    <xs:complexContent>
                        <xs:extension base="BxfText">
                            <xs:attribute name="synopsisName" type="xs:string"/>
                            <xs:attribute name="synopsisMaxLength" type="xs:integer">
                            <xs:annotation>
```

```
                                        <xs:documentation>Indicates the maximum number of characters expected
in the element. If set to -1 then the field is unlimited.</xs:documentation>
                                        </xs:annotation>
                                    </xs:attribute>
                                    <xs:attribute name="synopsisPurpose" type="xs:string">
                                        <xs:annotation>
                                            <xs:documentation>Optional way to flag a specific type of synopsis (eg
TVGuide, Nielsen, EPG, etc.)</xs:documentation>
                                        </xs:annotation>
                                    </xs:attribute>
                                </xs:extension>
                            </xs:complexContent>
                        </xs:complexType>
                    </xs:element>
                </xs:sequence>
            </xs:complexType>
</xs:element>
```



4.1.33 Video.XSD

Contains:



	include	loc:bxftypes.xsd	
	complexType	**TSVideo**	ann:Enumerates the various values relating to the presentation of video in a transport stream
	complexType	**Video**	ann:Enumerates the various values relating to the presentation of video
	complexType	**VideoTransition**	ann:Allows the user to specify specific actions to be used by the automation system to transition the video from one event to another
	complexType	**AFDData**	ann:Used to describe both Active Format Description Codes, Shorthand Text Descriptions and Bar Data options. (v3.0)
	simpleType	**AspectRatioType**	ann:Enumerates either 4:3 or 16:9 video presentation formats
	simpleType	**TSVideoEncodingType**	ann:Enumerates various methids used to compress video in a transport stream
	simpleType	**VideoEncodingType**	ann:Enumerates various methods of compressing video
	simpleType	**VideoFormatType**	ann:Enumerates the different video presentation formats
	simpleType	**VideoRateType**	ann:Enumerates the speed of a video transition
	simpleType	**VideoTransitionEnumType**	ann:Enumerates various transition options

Enumerates the various values relating to the presentation of video.