CMS Import Interface Specification

XML Turnaround Broadcast Schedule

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Preface

Document purpose

This document describes the schedule import interface format for turnaround broadcast schedule that can be used for CMS projects.

Audience

This document is intended for:

- Nagra product and engineering departments.
- Third party engineering departments for integration purposes.

Document Structure

This document is divided into the following parts:

Chapter : 1 General Architecture

This chapter provides an overview of the import and explains the FTP mechanism used by the CMS process to import automatically the XML files provided.

Chapter : 2 CMS BTV business rules

This chapter presents the CMS BTV business rules and data structures applicable to this interface.

Chapter : 3 XML file format

This chapter describes the import XML file format in detail.

Chapter : 4 Error file format

This chapter describes the error XML file format.

Document and Schema versioning convention

It is defined that the versioning of the CMS BTV Import Interface is based on three parts incremented as follow:

- The first part is incremented when a non-retro-compatible change is performed.
- The second part is incremented when the changes impact the Schema (for instance add a new tag)
- The third part is incremented when the changes impact only the documentation (for instance a correction in an explanation or in the typography)

The Schema file has only a two parts version number and the document has the three parts. In addition, the first two parts are aligned to the overall CMS release version number.

Related Documents

[1] XML grammar definition for the CMS Import BTV interface.
NagraVision, SHE-CMS
file: Import-CMS-BTV-Interface-v4.20.xsd

[2] ISO-8601 date and time format
http://www.iso.org/iso/support/faqs/faqs_widely_used_standards/widely_used_standards_other/date_and_time_format.htm

[3] ISO-639-2 language codes definition (3 characters)
http://www.loc.gov/standards/iso639-2

[4] ISO-3166-1 country codes definition (2 characters)
http://www.iso.org/iso/country_codes.htm

[5] CMS Data Fields Specification, EPG Fields for VOD and BTV
NagraVision, SHE-CMS
v4.20.0
file: DataFields-CMS-v4.20.x.docm

[6] ISO-4217 currency definition
http://www.iso.org/iso/currency_codes_list-1

List of Open Points

No table of figures entries found.

Document History

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4.23.0 / 2017-09-05 /Neeraj Kumbhkar • Initial version based on Import-CMS-BTV-Interface-v4.22.x.doc

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1. General Architecture

The CMS provides an interface allowing it to import scheduled broadcast events and their related products from another system. The interface takes the form of xml files.

1.1 Workflow overview

Figure 1 shows a typical system context for the use of this import interface. This document concerns the interface shown by the thick line labeled "2". It is important to understand this flow to know how the different channel, event and product identifiers are managed.

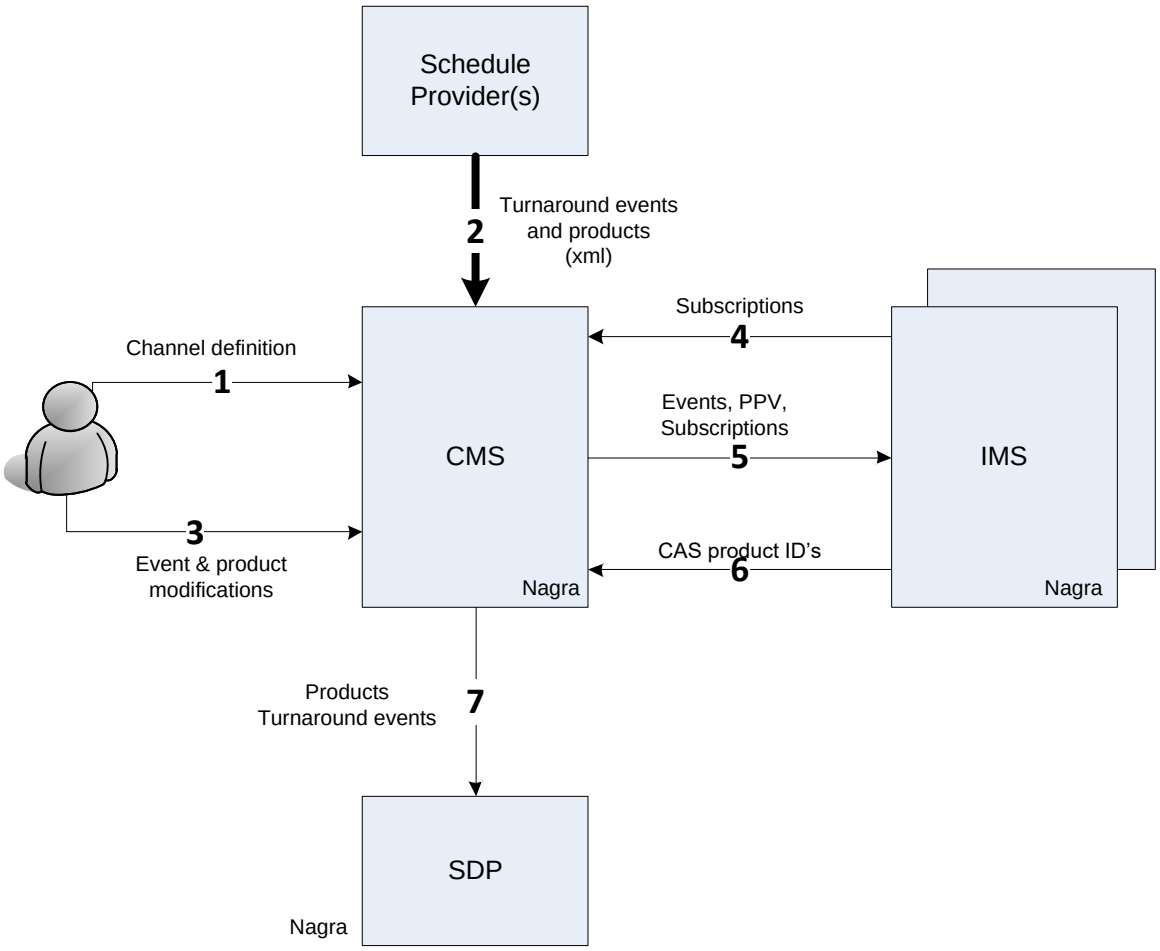


Figure 1 System context

The data flow through the system corresponds to the numbered lines of Figure 1:

1 The operator configures the broadcast channels, including entering the channel ID.

2 The turnaround broadcast events are imported into the CMS via the interface defined in this document. As well as inserting new events, this import interface also allows previously imported events to be updated or deleted. The interface allows products to be created, updated or deleted.

3 Optionally via the CMS GUI, a user may create new events and products or modify the imported ones. In order for these product assignments not to be lost when schedule is updated via the import, the schedule provider must provide program ID's that are preserved from one file to the next.

4 Channel subscription products may also be created in the IMS and exported to CMS over a Nagra internal xml file based interface. When any updates are performed in IMS a new export / import will be triggered to synchronize the CMS.

5 The products imported via this interface or created in the CMS are exported to IMS over an xml file based interface. Note that not all types of CAS support subscription definition by the CMS. These products are recorded in the CAS.

6 After the CMS defined products are created in the CAS, an export is automatically triggered that returns to the CMS the CAS product ID. This export is in fact the same interface as used at step 4 to provide the subscription definitions.

7 The event schedule and its EPG together with the product definitions including the CAS product ID are exported to the SDP. SDP is in charge of triggering the entitlement delivery to the end user device.

1.2 Data processing

This interfaces supports grouping data in files in three ways:

Broadcast events only	Typically used by a third party turnaround schedule provider.
Products only	Typically used in a multi-CAS context, without or without OTT delivery, where the products for each CAS and OTT delivery paths are managed separately by independent organizations.
Events and products	Typically used when the operator has control over both the schedule and products definition. In this case the products must reference the events included in the same file.

The CMS will commit all the data changes implied by the contents of a file to its database in a single transaction. If an inconsistency is detected, either within the data of the file, or between the file's contents and data already existing in the CMS database, an error will be raised and the changes will not be committed. When such a case occurs, the file provider must correct the error / inconsistency by submitting a new modified xml file, or editing the existing data via the CMS GUI as appropriate.

As a general guideline it is proposed that input xml files should contain the event / product data relating to a single channel and for a period of a maximum of 14 days. However the interface specification allows for the schedule of multiple channels to be included in a single xml file.

Important:

The CMS system uses a locking mechanism to eliminate errors due to concurrent modifications to the same period of schedule on a given channel. Therefore the automatic import will fail if it is executed while another process holds a lock on the relevant channel period. For example a user manually editing the schedule from the GUI will block any imports of the same channel for the same period. Note that the definition of single event products also requires the channel period to be locked.

1.3 File processing

The CMS import will be deployed as an agent that will run on a regular basis. When launched, the agent will retrieve the list of files to be processed by examining a specific configured directory, looking for data files whose name match a specific pattern (generally *.xml). This directory is located on a file server accessible to the CMS. FTP protocol is supported as well as direct file access.

Files will be processed in an order according to case sensitive alpha-numeric sorting of the file names. Therefore to ensure CMS processes files in the same order that they were generated it is proposed that the beginning of the file name contains the date and time of the file generation in a numeric format, year first.

Important:

In order to prevent the file access errors that would occur if the CMS agent were to try to process a file while it is still being generated or copied by the data provider, the data provider will perform a two stage provisioning operation. It will first generate or copy the file into a working directory and/or with a file extension that is different from that the CMS agent examines. Then secondly it will change directory and/or change file extension to correspond with what the CMS agent examines. If different directories are used, it is essential that they are on the same physical disk and file system so that the operating system can perform the change in an atomic action without provoking an extra data copy. In this way the CMS agent can only "see" the files once they are complete.

The CMS agent will make a local copy of the source file from the data provider's ftp server. Once this copy is done, it modifies the source file name adding the suffix ".progress" to show this file being processed.

When the CMS has processed the file, it returns an acknowledgement to the data provider by renaming the source file. The ".progress" suffix is removed and the suffix ".success" added if the import was successful, or ".failed" added when errors are detected during the import.

In the case of failure an error log file with the same name as the source file and an ".error" extension will be created and written into the same directory as the source file. The file structure is described in § 4. In addition an alarm will be raised.

No log file is explicitly generated for successful import operations; however messages are logged in relevant monitoring view in the CMS GUI.

When processing multiple files, if an error is detected for one file, the import process will still try to import the subsequent files.

It is assumed that the data provider will take care of deleting the processed files once it has taken note of the acknowledgement.

2. CMS BTV business rules

This chapter introduces the CMS BTV business rule and data model structure pertinent to the current BTV import interface, particularly for the definition of products. Figure 2 presents an example illustrating the model.

Starting from CMS4.3, the notion of channel versions is supported by this interface.

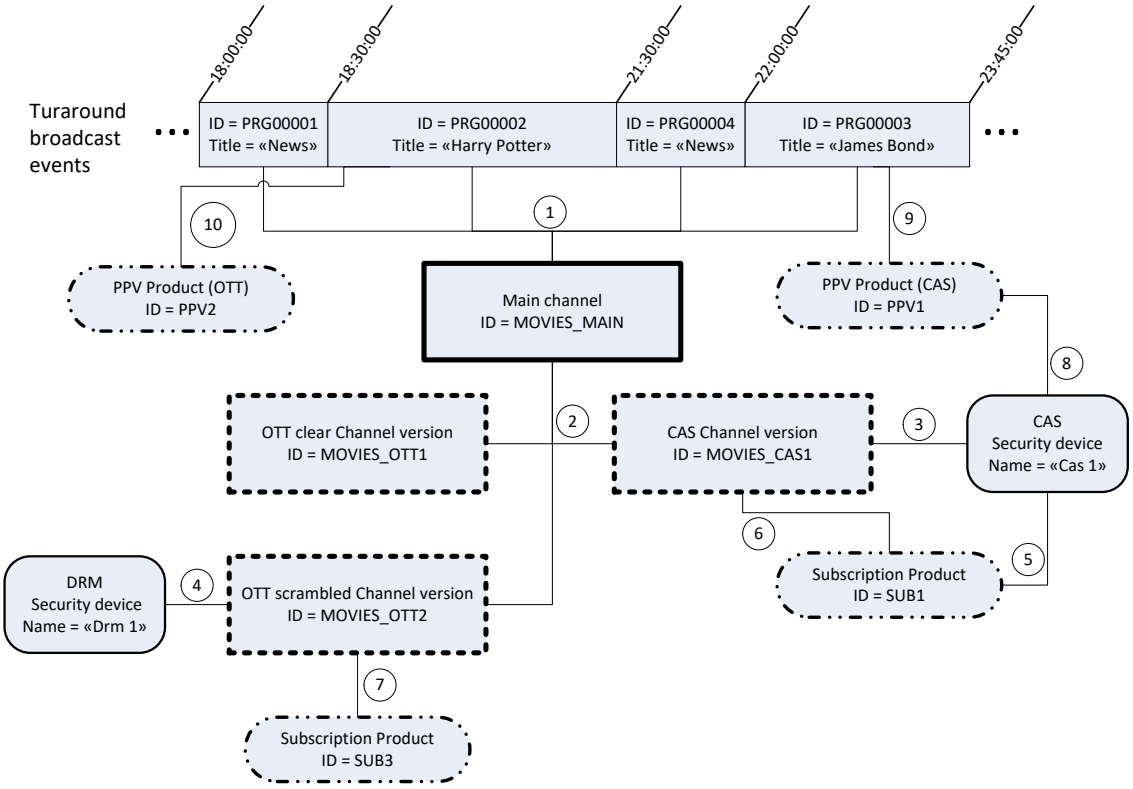


Figure 2 BTV data model overview

The principal aspects of the model are described below with the link numbers referring to the circled numbers in Figure 2:

Rules concerning channels as security devices:

- All the broadcast events of the same TV channel are linked to a single channel in the database designated "Main Channel" – links 1
- A TV channel may be protected delivered to end viewers via multiple paths. There are two groups of paths:
    - DVB broadcast protected by a CAS.
    - OTT delivery that may be in the clear or protected by a DRM system.

- Each CAS and DRM system is represented by a "CAS Security device" or "DRM Security device" in the database.
- For each delivery path, a "Channel version" is created in the database and linked to the "Main Channel" holding the events – links 2
- CAS channel versions are linked to the corresponding CAS device – link 3
- A scrambled OTT channel version is linked to the corresponding DRM device – link 4
- A clear OTT channel version is not linked to any security device.

Rules concerning products (see also § 3.6.1)

- A subscription product enforced by a CAS system is linked the corresponding CAS device – link 5, and to the CAS channel version(s) it sells – link 6.
- A subscription product for OTT delivery path(s) is linked to the corresponding OTT channel versions(s) it sells – link 7.
- A PPV product enforced by a CAS system is linked to corresponding CAS device – link 8, and to the single event that it sells – link 9.
- A PPV product for OTT delivery paths(s) is linked to the single event that it sells – link 10. It will apply for all the OTT delivery paths of the event's channel.
- Note that contrary to CAS products, OTT products are independent of the DRM system and are therefore not linked to any device.

Additional rules:

- Channel versions are not linked to multiple devices.
- A main channel will have most one channel version per CAS security device.
- A main channel can have multiple channel versions linked to the same DRM security device.
- Products may not be linked to multiple devices.
- Subscription products may sell multiple channels.
- OTT subscriptions may sell both scrambled and clear OTT channel versions. They cannot sell CAS channel versions.
- For CAS subscriptions, all the channel versions it sells must be linked to the same CAS security device, which is the same one the product is linked to.
- CAS PPV products may only be created if the event's channel has a version that is linked to the same CAS.
- OTT PPV products may only be created if the event's channel has at least one OTT version.
- PPV products must be linked to exactly one event.
- Subscription products may exist alone, i.e. without being linked to any channel.

- Once a CAS product is created, its link to the CAS security device may not be removed.
- Once an OTT product is created, it may not later be linked to a CAS device.
- Over the lifetime of a product its links to channels or events may be added and removed.

The current interface enables the creation, modification and removal of broadcast events and products.

Channel and device definitions and links may not be modified by this interface; they are just referenced via the ID for channels, and name for devices to establish the appropriate links with events and products. That is, links 2, 3 and 4 of Figure 2 do not have counterparts in this interface.

3. XML file format

In general the xsd does not enforce any minimum or maximum lengths for string values. The reader should refer to the description of the elements and attributes in this document.

The whole xml schema of this interface is available as reference document [1].

The schema file name should not be included in the supplied data files. The CMS will validate all incoming source files using the referenced schema file located within the application resources.

3.1 File encoding and data formats

The character encoding of the source file must correspond to the "encoding" attribute of the first line of the xml file. NagraVision advises to use UTF8 encoding in order to easily manage ASCII and non-ASCII texts in a uniform way.

All date & time values are exported in GMT time using a format based on ISO-8601 [2].

Since the different import and export interfaces of the CMS transport common data, the details of the data fields are collected together in reference document [5].

3.2 Element <ScheduleProvider>

<ScheduleProvider> is the root element of the data structure. Each file supplied to the CMS will contain exactly one instance of this element.

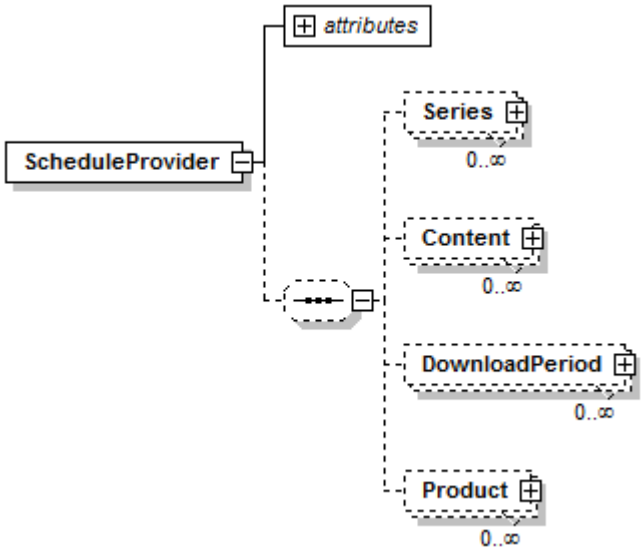


Table 1 < ScheduleProvider > attributes details		
Name	**Type**	**Description and typical value**
id	IdType mandatory	See §3.15 Unique identification of the data provider. Maximum length 50 characters
scheduleDate	gmtdatetime mandatory	See § 3.14 Provides a reference date for the XML file. Normally will be the date and time that the file's provider generated it. Eg "2011-08-04T08:15:58Z"

The id attribute must match the ID of one of the company objects already existing in the Media Live CMS database that has the role "Broadcaster". All content items created from the input XML file will be associated to that company. This ID will provide the content attribute "companyId".

The scheduleDate attribute is independent of the dates and time of the events or products included in the file; it provides a reference for a human reader of the file. Apart from validating the syntax of the value, the import process will ignore this attribute. It is suggested that the schedule provider fills this attribute with the date and time of the xml file generation.

This interfaces supports grouping data in files in three ways, reflected by the combinations of child elements within <ScheduleProvider>:

Broadcast events only	Typically used by a third party turnaround schedule provider. Such files contain only <Series>, <Content> and <DownloadPeriod> child elements.
Products only	Typically used in a multi-CAS context, without or without OTT delivery, where the products for each CAS or OTT are managed separately by independent organizations. Such files contain only <Product> child elements.
Events and products	Typically used when the operator has control over both the schedule and products definition. In this case the products must reference the events included in the same file. Such files contain all the elements supported by the interface. After the initial insertion of this data into the CMS database, subsequent updates of events and products may be supplied in separate files.

Although it is legal for a file to contain multiple <DownloadPeriod> elements, it is proposed to put a single period per file to aid recovery in the case where the CMS rejects an input file. In this way only the data of a single channel would be rejected.

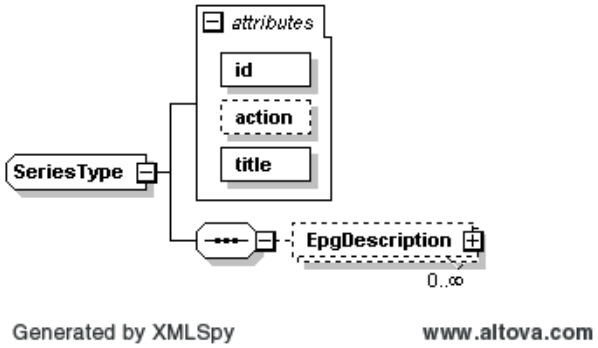
The import process will modify the CMS database by applying the changes implied by each element in the order that they are supplied in the xml file.

3.3 Content management

This chapter will regroup the <Series> and <Content> elements and their sub-elements. All these elements participate to the Content data.

3.3.1 Element <Series>

The <Series> elements within <ScheduleProvider> are defined by the type SeriesType:



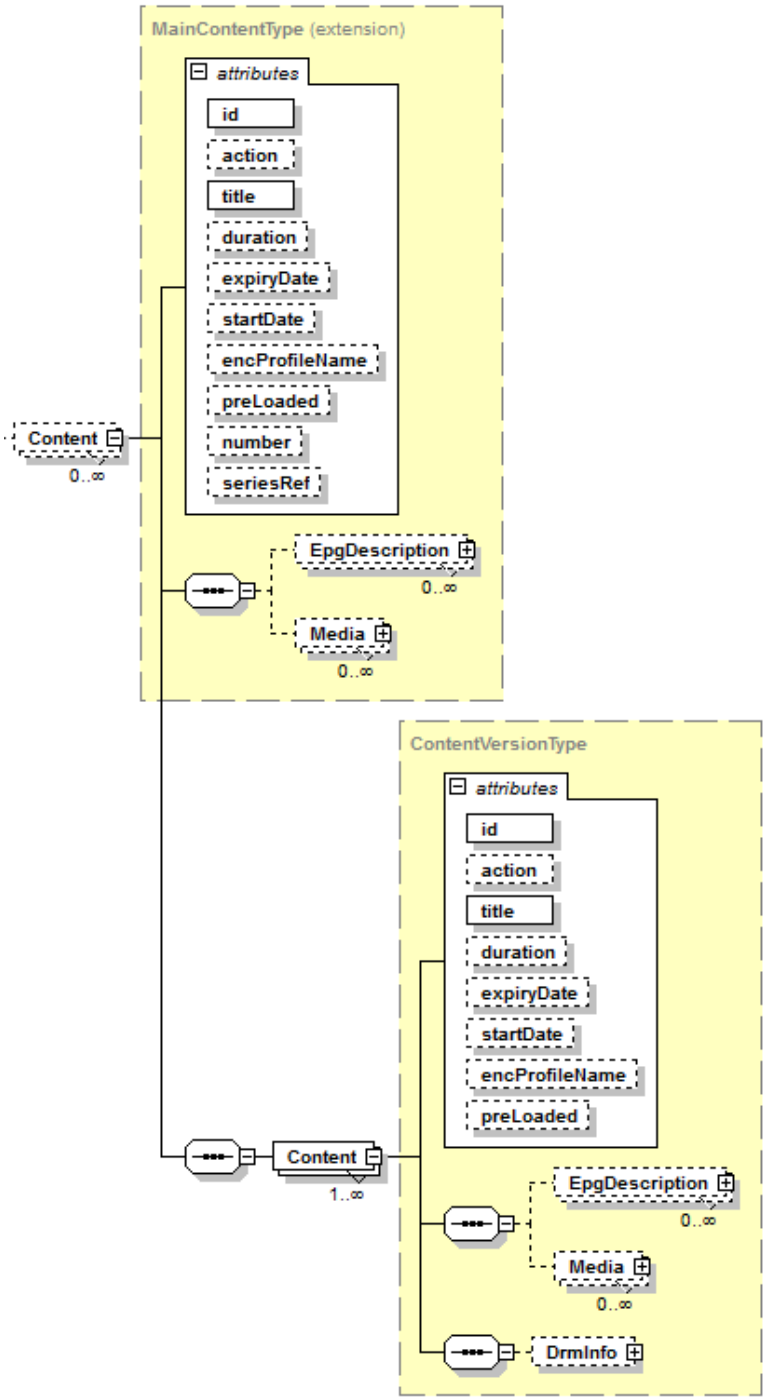
The data provider provides information about available Series. It includes the series EPG description.

Table 2 <Series> attributes details

Name	Type	Description and typical value
id	IdType mandatory	See §3.15 Unique identification of the series. Maximum length 50 characters
title	xs:string mandatory	The working title of the series. Maximum length 100 characters. May not start or end with whitespace.
action	ActionType, default value : override	See §3.12 Action to apply to the element

3.3.2 Element <Content>

The <Content> elements within <ScheduleProvider> are defined as below:



The data provider provides information about available content. It includes the movie meta-data and basic information as approximate duration.

Table 3 <Content> attributes details		
Name	**Type**	**Description and typical value**
id	IdType mandatory	See §3.15 Unique identification of the content. Maximum length 50 characters
action	ActionType. default value : override	See §3.12 Action to apply to the element.
title	xs:string mandatory	The working title of the content. Maximum length 100 characters. May not start or end with whitespace.
duration	DurationType. Default value: 0	See §3.3.8 Movie approximate duration in seconds.
number	xs:integer optional (conditional)	The index of the episode in the series. Note: This attribute is forbidden on episode/content versions. This attribute is forbidden if the attribute seriesRef is not specified or is empty and is mandatory if seriesRef is present and not empty. Zero value is allowed and is suggested when no "proper " number is available
seriesRef	IdType or empty ("") optional	See §3.15 The ID of this episode's Series. If specified and not empty, number attribute must be filled. Note: This attribute is forbidden on episode/content versions. Maximum length 50 characters.
expiryDate	gmtdatetime optional	See §3.14 The expiry date of the content. If no expiry date is specified, the Media Live CMS import tool will supply a default value (constant) equal to the maximum expiration date (January 1st, 2038). For a main content, this date is adjusted such that it is always greater or equal the max expiry date of its versions. Used for DCM generation.

Table 3 <Content> attributes details		
Name	**Type**	**Description and typical value**
startDate	gmtdatetime optional	See §3.14 The start date of the content. If no start date is specified, the Media Live CMS import tool will supply a default value equal to the date of the import. For a main content, this date is adjusted such that it is always less or equal the min start date of its versions.
encProfileName	xs:string optional	Name of an existing encoding or liver profile.
preLoaded	xs:Boolean. Default value: false.	Boolean flag. If a content is preloaded (asset files preloaded on destination devices), this flag is set to 'true'.

These elements are used to provide the details of a main content, also called Production in Media Live CMS.

The duration attribute provides the approximate duration of the content, specified in seconds. The minimum and maximum durations are configured in the Media Live CMS system.

When deleting a content (action = "delete") the Media Live CMS import tool will only examine the id attribute, and use that to identify the content data to be removed from the database. All child XML components (<EpgDescription>) in the file will be ignored.

The expiryDate attribute is optional, it determines when the production expires and can be purged. In the Media Live CMS GUI the corresponding field is 'Purge date'.

The seriesRef defines the link between the <Content> and the <Series>.

If the seriesRef attribute is an empty string and the content already exists and is an episode, the content will be unlinked from its series and will become a standalone content. In this case, all inherited EPG values will be copied into the standalone content.

If the seriesRef attribute is present and is not empty and the content already exists but is not an episode, the content becomes an episode of the specified series. In this case, EPGs of the content will override EPGs inherited from the series.

If the seriesRef attribute exists and is not empty and the content already exists and is an episode of another series, the content will be un-assigned from its old series and assigned to the specified one.

The different episodes (`<Content>` element) within the same series could have the same `number`. If a `textual episode number` is needed, this textual number will be filled in an EPGElement field.

3.3.2.1 Main Content and Versions

Often a single item is not enough to clearly define content. For instance, for a same movie you might want to manage a high definition version and a standard version without duplicating the editorial (EPG) data. For the Production (main content), Media Live CMS can allow the operator to create multiple versions. To reflect this structure, the import format requires adding a <Content> inside another (but only on the first level) as represented in the figure above. This encapsulation is not represented in the ContentType definition to avoid a recursive encapsulation.

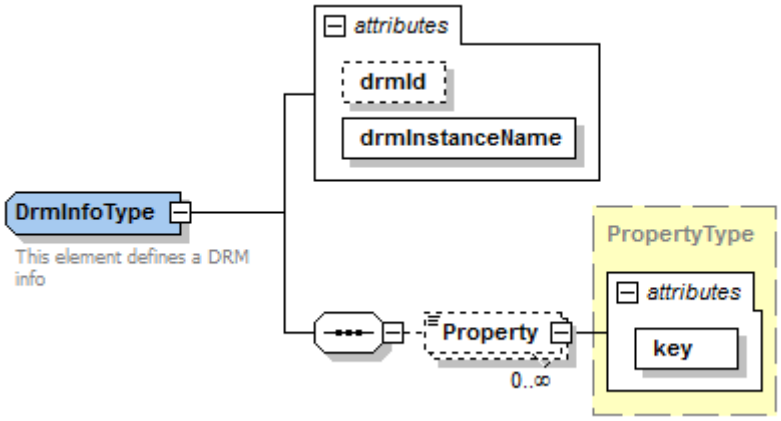
A <Content> that is created as a Content Version (inside another <Content>) cannot be re-imported outside the same Main Content. In the same idea, a Main Content cannot be re-imported inside another <Content>.

A <Content> that is created as a Content Version must not define any seriesRef or number attribute.

A <Content> that is created as a Content Version may have a <DrmInfo>(§3.3.3).

3.3.3 DrmInfo element

The <DrmInfo> element within <Content> is defined by the type DrmInfoType:



At each import, the <DrmInfo> information for a specific parent element will be imported. The drmId and drmInstanceName attributes are used to link a content version to a specific DRM system.

When a <DrmInfo> information has been set in a previous import, it can be updated or removed. All attributes can be updated by providing a new value. To delete a <DrmInfo> information, the drmInstanceName attribute must be provided with an empty value (in that case, drmId attribute is ignored if provided).

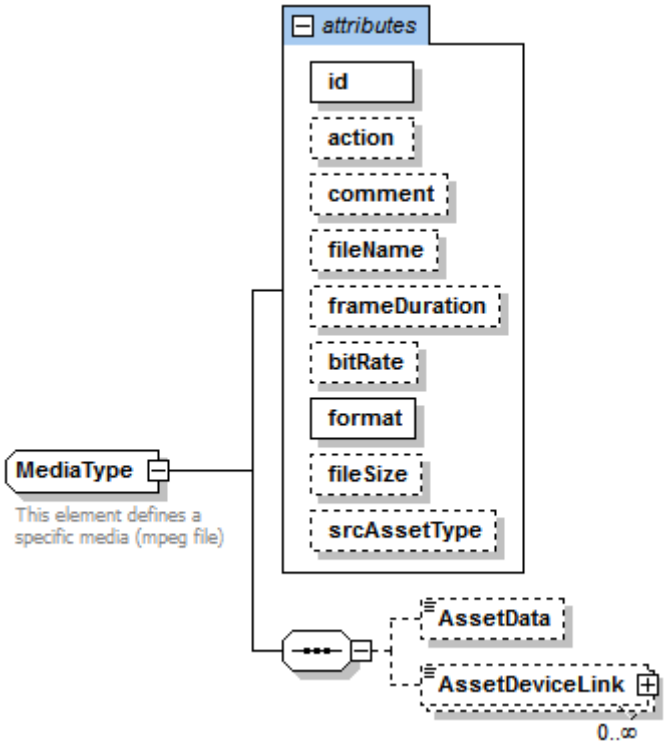
If a <DrmInfo> information has been set in a previous import but has been omitted next, nothing is happening.

Table 4 <DrmInfo> attributes details		
Name	**Type**	**Description and typical value**
drmId	DrmIdType, max 256 chars Not mandatory	DRM information identifier.
drmInstanceName	String, max 100 chars mandatory	Name of the DRM instance assigned to the content version.

This element provides a container in order to supply a set of metadata using the `<Property>` child element.

3.3.4 Media element

The <Media> elements within <Content> are defined by the type MediaType:



At each import, the <Media> information for a specific parent element will be imported. Including frame length and file name.

Table 5 <Media> attributes details		
Name	**Type**	**Description and typical value**
id	IdType mandatory	See §3.15 Unique identification of the media. Maximum length 50 characters.

Table 5 <Media> attributes details		
Name	**Type**	**Description and typical value**
action	ActionType. default value : override	See §3.12 Action to apply to the element.
comment	xs:string optional	Operational comments of the medias. Maximum length 3000 char, unicodeUTF-8
fileName	xs:string optional	Name of the file on the storage device. Maximum length 255 characters
frameDuration	DurationType default value : 0	See §3.3.8 The duration of the Media in frames.
bitRate	xs:long optional	The bit rate in bits/sec.
format	FormatEnum mandatory	See §3.3.5 The format of the media used to identify its type.
fileSize	xs:integer optional	The file size in bytes.
srcAssetType	xs:string optional (conditional)	Value of SrcAssetType metadata. Mandatory for reference assets. Not used by other asset types.

AssetData is a CDATA object encoded in base64.

In order to specify asset type (HD, SD…) an attribute 'srcAssetType' has to be present on media element which are reference assets

Concerning the location of the asset, attributes 'location' and 'storageName' have to be used together on a media element. If one is present, the other is mandatory. A default value is configurable for these two parameters in import algorithm parameter set.

3.3.5 Simple type FormatEnum

This type is used to specify the format of a media. It is an enumeration of string that can have the following values:

AV_ClearTS
AV_EncryptedTS
AV_PlaylistName
AV_HarmonicOSPlaylistName
Data_PMT
AV_Dummy

3.3.6 Element AssetDeviceLink

The <AssetDeviceLink> elements within <Media> are defined by the type AssetDeviceLinkType:

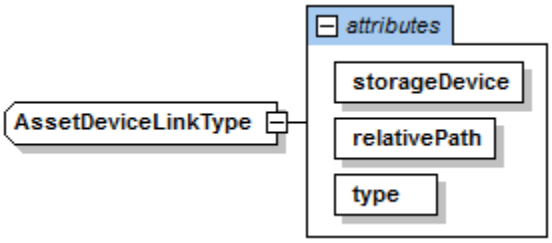


Table 6 <AssetDeviceLink> attributes details		
Name	**Type**	**Description and typical value**
storageDevice	xs:string mandatory	Name of the device where the asset is stored. Device must existe withing Media Live CMS.
relativePath	xs:string mandatory	Relative path of the asset. Asset full path consists of the concatenation of an access point path and this relative path.
type	ADLEnumType mandatory	See §3.3.7 Type of the asset device link (ADLEnumType).

If an <AssetDeviceLink> with the same type is already present on the asset, it will be updated. Otherwise, a new entry will be created.

No ADL will be deleted during import process.

The ADL is intended for contents used in vod context, therefore this element will be ignored when ingesting BTV data.

3.3.7 Simple type ADLEnumType

This type is used to specify the type of the asset device link of a media. It is an enumeration of string that can have the following values:

Source
Destination
Archive
Other

3.3.8 Simple type DurationType

This type is used to specify a duration.

The identifier is a long positive value.

3.4 Element <DownloadPeriod>

The <DownloadPeriod> elements within <ScheduleProvider> are defined by the type DowloadPeriodType:

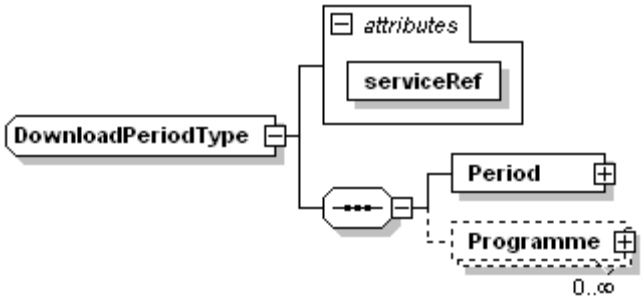


Table 7 <DownloadPeriod> attributes details		
Name	**Type**	**Description and typical value**
serviceRef	IdType Mandatory	See § 3.15 Id that uniquely identifies the channel on which all the child events are broadcast. The corresponding channel must already exist in the CMS database. Maximum length 50 characters.

A <DownloadPeriod> contains the broadcast schedule for the specified channel for the period specified by the child <Period> element. The CMS will logically replace the schedule it may have received for this period in a previous file or files by the schedule from this file. The description of the <Programme> element (§ 3.5) provides details on how the replacement is applied.

A <DownloadPeriod> element containing no child <Programme> elements indicates that there are no events for the period, and the CMS will delete all previously existing events from its database.

All the events listed within the <DownloadPeriod> element must lie within the time slice specified by the child <Period> element. The events may be listed in any order, but it is strongly suggested that they be listed in chronological order to aid human analysis in case of errors. The following rules apply, and the file will be rejected if they are not respected:

Period.start <= start of any programme

Period.end >= end of any programme.

The CMS does not allow the schedule events in the past to be modified. In addition, a **"danger zone"** is defined that is a sliding time window starting at the current time, for a configurable period of time. Like past events, events in the danger zone may not be modified either. The size of the danger zone is configured prevent "useless" changes being made to the schedule, once it is too late for the change to get propagated through all the linked systems.

The xml files may contain programmes in the past or in the danger zone. The CMS import process will report a warning for each such programme indicating that the data of that event has not been imported, and otherwise ignore it. The other programmes in the same file in the future will be accepted.

The schedule provider may freely choose the period for which the schedule is supplied, for example there is no requirement that the periods be aligned to "days".

The ID given the **serviceRef** attribute should refer to the main channel, see § 2 and Figure 2. However the import will also accept the ID of one of the channel versions, and in this case the import automatically replaces it by the ID of the main channel for its processing.

It is allowed for the file to contain multiple download periods for the same channel, but they may not overlap.

The following figures illustrate the behavior of the CMS import process for different import/update scenarios:

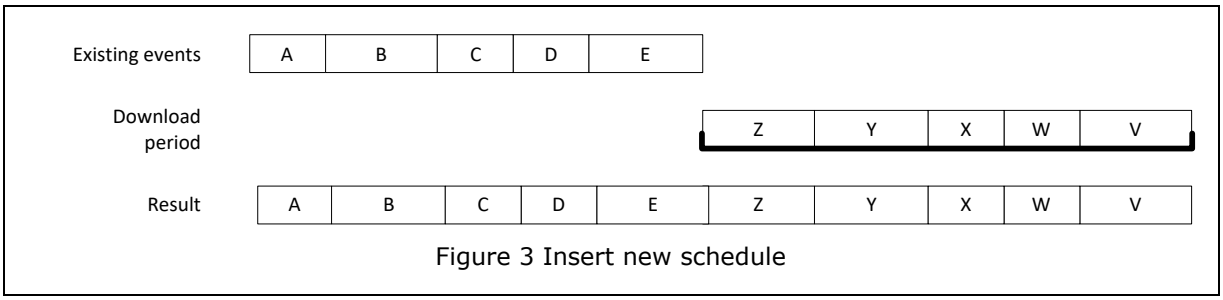


Figure 3 Insert new schedule

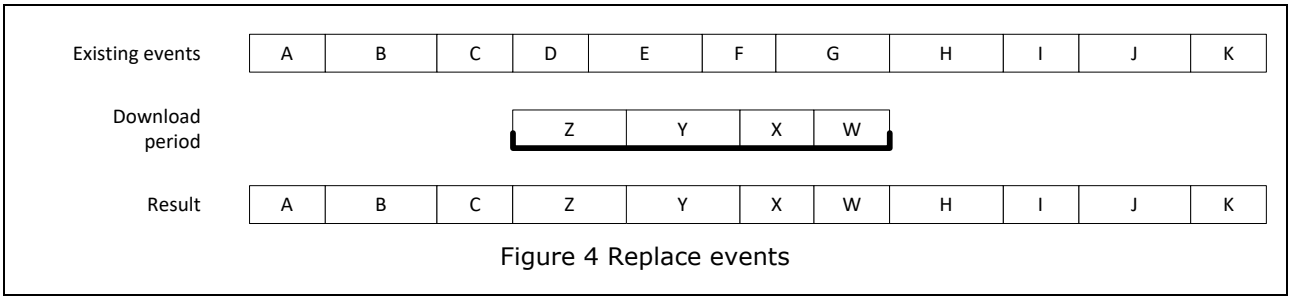


Figure 4 Replace events

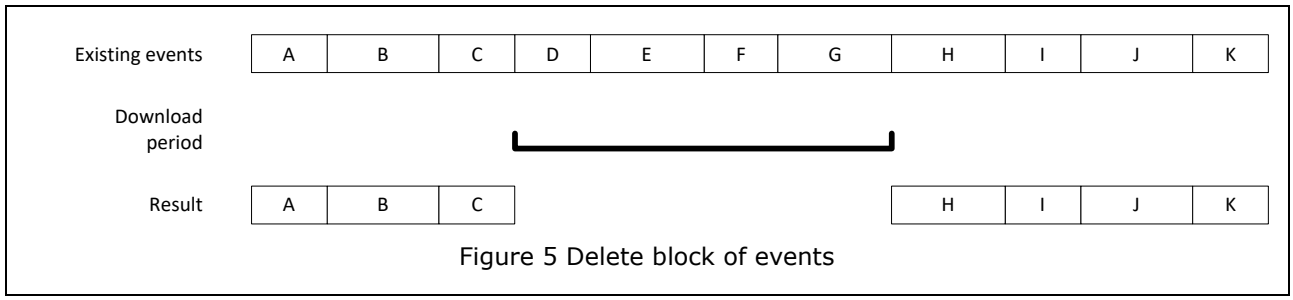


Figure 5 Delete block of events

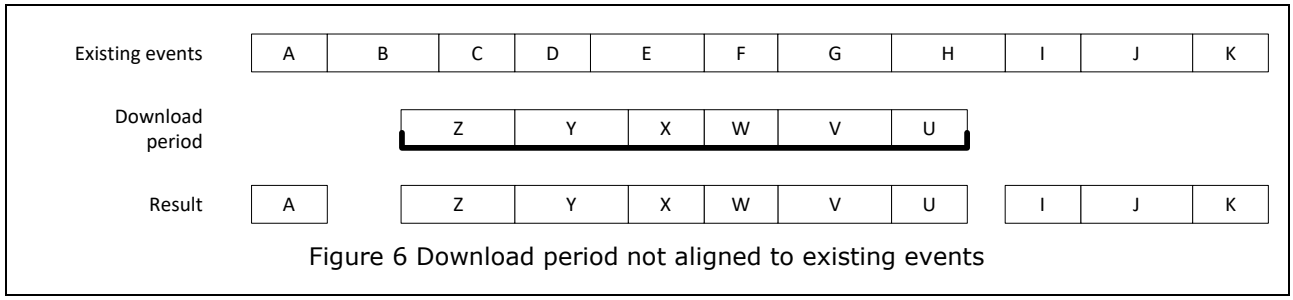


Figure 6 Download period not aligned to existing events

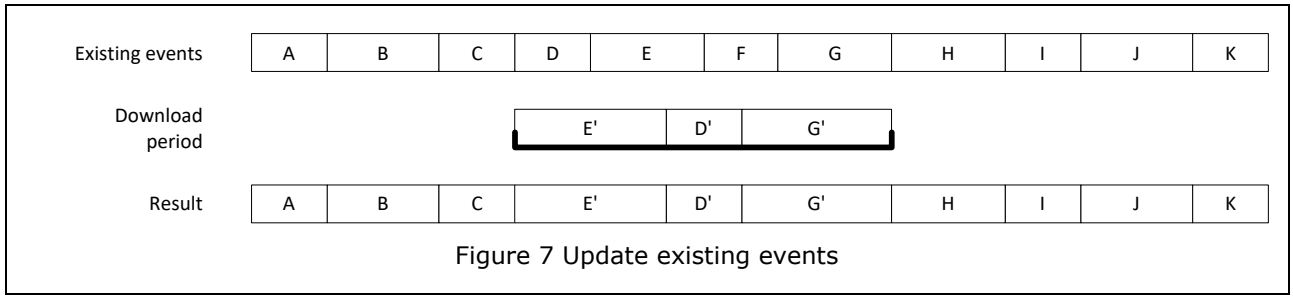


Figure 7 Update existing events

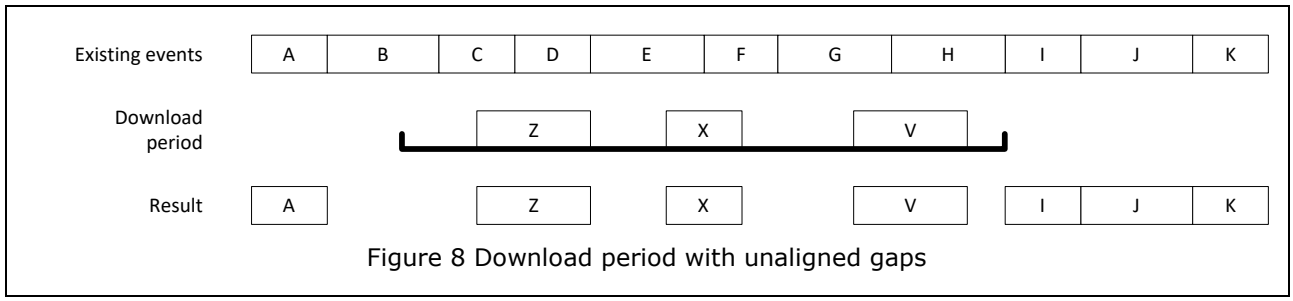


Figure 8 Download period with unaligned gaps

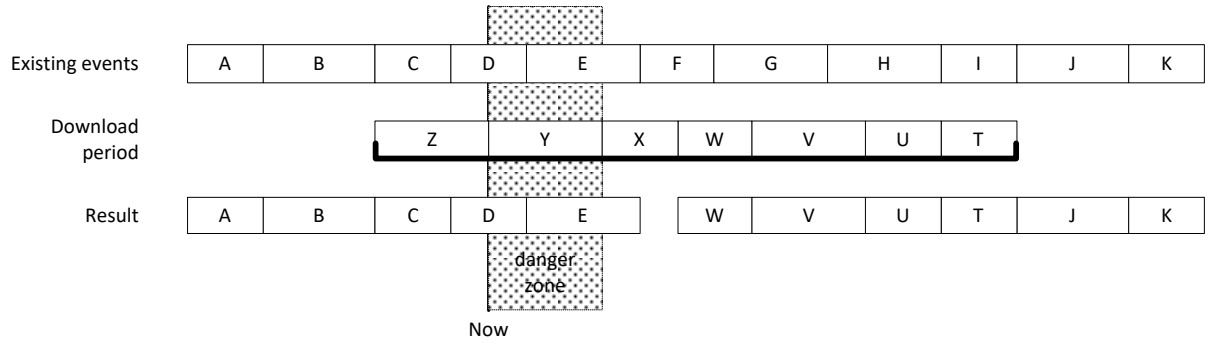


Figure 9 Download period with events in the past

3.5 Element <Programme>

The <Programme> elements within <DownloadPeriod> are defined by the type ProgrammeType:

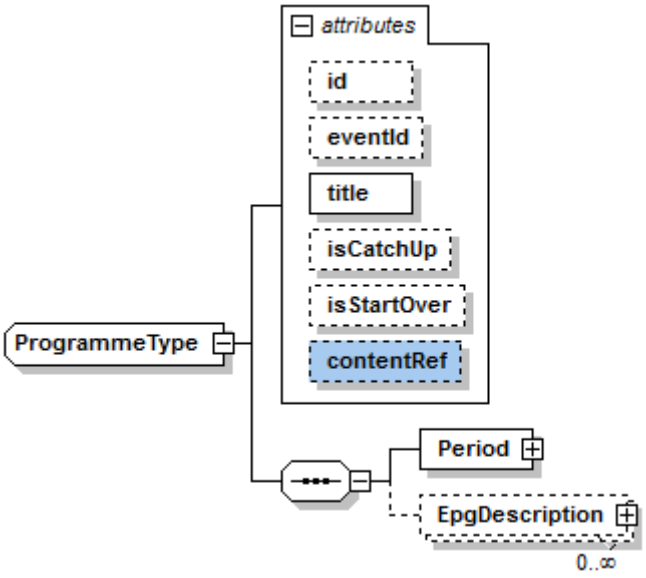


Table 8 <Programme> attributes details		
Name	**Type**	**Description and typical value**
id	IdType optional	See § 3.15 Event identifier. Must be unique amongst all programmes on all channels. Maximum length 50 characters.
eventId	xs:integer optional	A 16 bit integer value. Designed to be used for the DVB event ID. Value range 0 .. 65535
title	xs:string mandatory	The working title of the event. Maximum length 100 characters. May not start or end with whitespace.
isCatchUp	xs:boolean optional	Flag indicating that the time-shift "catch-up" function is available for this event. Values "true" or "false".
isnPvr	xs:boolean optional	Flag indicating that the time-shift "nPvr" function is available for this event. Values "true" or "false".
isStartOver	xs:boolean optional	Flag indicating that the time-shift "start-over" function is available for this event. Values "true" or "false".
contentRef	IdType optional	See §3.15 Id that uniquely identifies the linked main production. Maximum length 50 characters.

The <Programme> element specifies one broadcast event.

The **id attribute** contains the unique identifier of this event in the CMS database, and is used to reference to the event both within this interface for product definition and also with the other systems the CMS interfaces. If not supplied during the import the CMS automatically assigns a value when inserting the entry in the database.

The **eventId attribute** will contain a 16-bit unsigned integer value. It is intended to provide the broadcast "DVB-event-ID". However a standard CMS4 deployment does not have an interface that is capable of supplying such values to a DVB SI spooler. The CMS applies no validation on the uniqueness of this value.

The **title attribute** contains the working title (for the CMS operator) for this event.

Note that the title that should be displayed to the end-user in the EPG is supplied in the localised <EpgElement key="Title"> child elements of this <Programme>, and may be different to the working title.

The `contentRef` defines the link between the `<Programme>` and the `<Content>`. A programme can only be linked to a main content. It is important to undertand that the `<Content>` linked to

`<Programme>` cannot be changed when defined. An update of a `<Programme>` will be refused if the `contentRef` does not refer to the same `<Content>` as the previous import.

The replacement of the schedule provided in the <DownloadPeriod> is done by matching the programmes provided in the download period against those already existing for the same period in the database using the "id" attribute from the <Programme> elements:

- If a matching programme is found, the database entry is updated with the data from the new file.
- If no existing entry matches the "id" a new database entry is created.
- Finally, the existing database entries which have no matching entry in the xml file are deleted.

Since the "id" attribute is optional, in the case where the input file does not provide "id"'s the existing database entries will always be deleted and new ones created.

Thus when a previously imported xml file is re-imported a second time, if programme "id"'s are provided no change will be made to the CMS database. However when no "id"'s are present delete & insert operations will be applied to the database.

An error will be raised and the import fail if a programme exists in the CMS database with the same ID but located outside the download period or on a different channel.

Therefore when a programme is re-scheduled the xml file must contain download period(s) covering both the period where the programme was previously scheduled and its new position. A single download period may be used when the programme is re-scheduled on the same channel and the new and old schedule are close together in time, otherwise two download periods would be used.

The CMS does not support rescheduling an event from the past i.e. the ID of a programme from the past cannot be used for a new programme, as long as the old programme has not been purged from the CMS database.

Important:

When a programme is deleted from the CMS database, all PPV products linked to it are also deleted. Thus in order to prevent previously defined PPV products from being deleted when schedule is updated via the import, it is necessary for programme "id" to be provided in the import files and that their values are maintained across the different update files.

It is strongly advised that when single event products are to be defined (via this import interface or the CMS GUI) that persistent "id"'s are always provided.

Child <EpgDescription> elements are included inside <Programme> to specify additional meta-data values of the event. See Programme EPG fields in [5] for the list of possible fields.

When the attributes **isCatchUp, isnPvr** or **isStartOver** are not present in the xml file the behaviour is:

- When creating a new programme, values will be set using default values from the channel's definition in the CMS database.
- When updating an existing programme, the values in CMS database are preserved

3.6 Element <Product>

3.6.1 Product types

The <Product> elements within <ScheduleProvider> are used to define the BTV products supported by the CMS. These products allow end-users to have access to broadcast events.

CMS4 does **not** support any event package product, i.e. a product that would sell multiple specifically selected programmes.

While the CMS provides the means for the head-end operator to define the product offering, it does not manage the way the corresponding entitlements are distributed to the end-users or enforce how the users pay. The CMS can play the role of a synchronization point between the different systems performing these functions, in particular to provide the correspondence between different identifiers.

See also § 2 CMS BTV business rules.

3.6.1.1 Subscription

A subscription product is linked to one or more broadcast channels. It gives access to all the events broadcast on these channels.

In the CMS data model there is no explicit link between the events and subscription product, it is implicit: event linked to channel – channel linked to product. This structure is reflected in the current interface.

During the lifetime of a subscription the set of channels may evolve with channels being linked to and unlinked from the subscription.

One channel may be linked to multiple subscriptions, potentially associated to different CAS's or the OTT platforms.

Subscriptions usually have a long life-time.

Important:

Not all types of CAS allow the CMS to define subscription products, for those that do not allow it, the subscription will be defined in the CAS system and exported from the CAS and imported into the CMS. Attempts to define subscriptions for such CAS's will be rejected by this interface, causing an error to be raised and the file import operation to fail.

3.6.1.2 Single event PPV

Broadcast events may be sold individually, and the single event **P**ay **P**er **V**iew (PPV) product is used for this case.

A single event PPV is linked to exactly one broadcast event. An event cannot have more than one PPV for the same CAS instance. However multiple PPV products per event for the OTT platform are allowed.

For CMS4, only "ordering" type PPV products are supported, where the right is delivered from the head-end; "impulsive" PPV are not available.

3.6.1.3 Free access

If no product is linked to an event either directly (PPV) or indirectly (channel subscription) this event will be freely available to end users.

Depending upon the functionality of the CAS or DRM system managing access the broadcast stream may be in the clear or encrypted. If the stream is encrypted then the keys/licenses allowing decryption will be delivered to the end-user device automatically without the end-user having to go through a purchase process.

This import interface does not include any attribute specifying whether an event is encrypted or not.

3.6.1.4 Multi-CAS, Multi-DRM

Starting from CMS4.2 products for multiple CAS and DRM systems are supported.

Distinct products are created for each CAS. For DRM controlled access i.e. OTT service delivery, the products are independent of the DRM systems.

For example with CAS A and CAS B, both managing the purchase of an event by a PPV: in the CMS database 2 PPV products must be created both linked to the same event, and each linked to the corresponding CAS device.

The product offering may be totally different between the multiple CAS's for example for CAS A all events be sold via channel subscriptions, while for CAS B each event is sold via an individual PPV. It may also be possible that for CAS A events must be purchased i.e. have products, while for CAS B they are free.

PPV products may not be supported by all DRM systems, i.e. the DRM system may only be able to control access at the level of the broadcast channel, and not per individual event. The CMS does not prevent the user from defining OTT PPV products; it is up to the user to know the limitations of the overall platform.

3.6.1.5 Multiple products on an event.

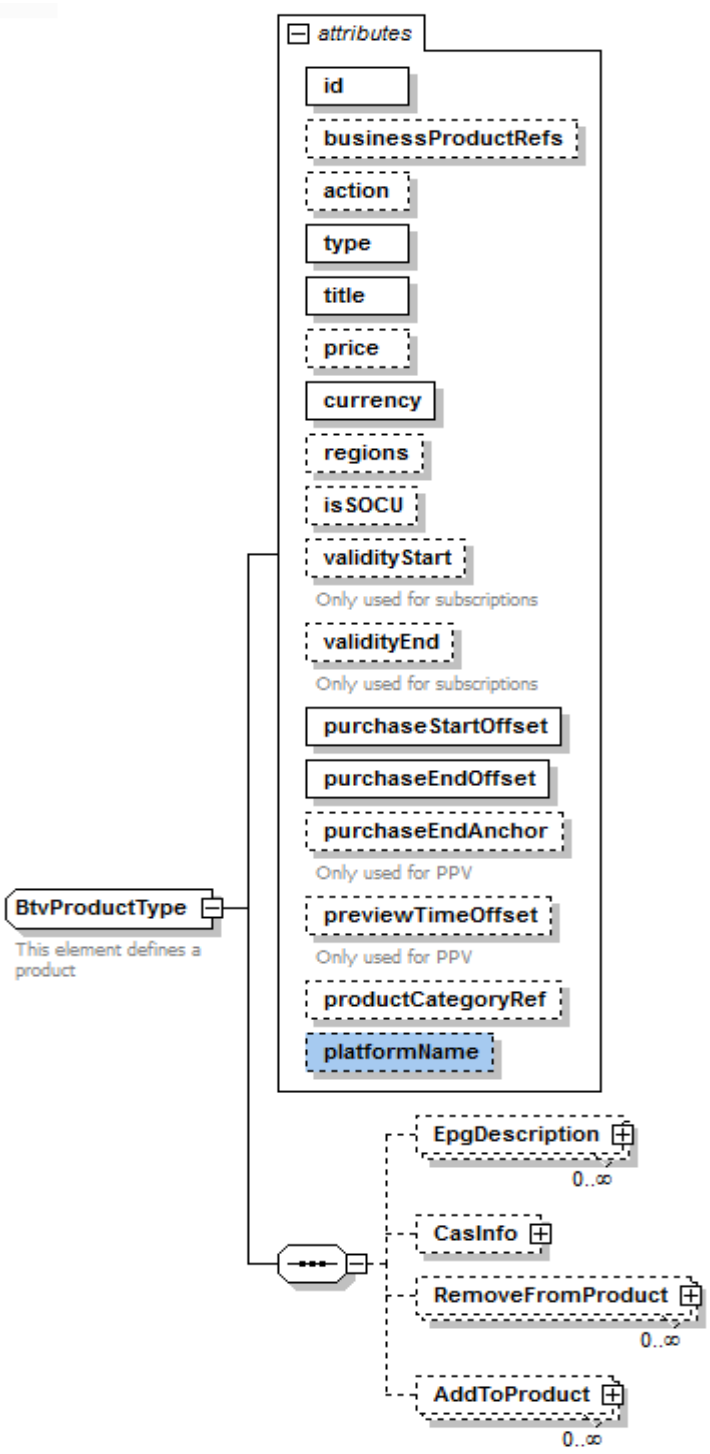
For a given CAS, it is possible that a single event may be sold by multiple products, for example its channel has one or more subscriptions as well as having a single PPV.

This import interface does not define the overall system behaviour for this case, specifically if the end-user has to have purchased all of the products to have access to the event, or just one them.

Note that it is not possible to define a product that sells multiple, individually selected events.

3.6.2 Xml

The <Product> elements are defined by the type BtvProductType:



In this interface a single type of xml element, <Product> is used to specify all products. Therefore the use of the different attributes of this element are dependent upon the type of product. These usage rules of the attributes and child elements are described in § 3.6.3 and § 3.6.4.

Table 9 <Product> attributes details

Name	Type	Description and typical value
id	IdType mandatory	See § 3.15 Identifier of the product. Id's are globally unique for the whole CMS database. Maximum length 50 characters. e.g. "LYS091237325"
businessProductRefs	xs:string optional	List of Identifiers of the related business products, semi-colon separated. These ids must match: - Already ingested product ids (business products) - Product ids (business products) defined in the same ingest XML file e.g. "1237325;96423;abcdf" In case of update (action=override and product already defined), businessProductRefs list remains unmodified if this attribute is not present else the businessProductRefs list is replaced by the new value of this attribute
action	ActionType optional	See § 3.12 Used to specify the operation for this product: delete or override. Default is "override", ie update if already exists, if not create.
type	ProductEnumType Mandatory	See § 3.17 Specifies the type of product. E.g. "subscription"
title	xs:string Mandatory	The name of the product. Maximum length 100 characters. May not start or end with whitespace. E.g. "Premium SportTV HD"
price	xs:decimal optional	A non-negative numeric value. If the attribute "price" and "ProductCategoryRef" are provided at the same time, the product direct price will override the product category price definition

Table 9 <Product> attributes details		
Name	**Type**	**Description and typical value**
currency	xs:string Mandatory	The currency of the price. 3 letter, upper case, currency code from ISO 4217 [6]. Allowed individual values are listed in the CMS mapping table TYPES.CurrencyCodeISO (see [5]) and this configuration can be adapted on-site. Eg "EUR"
regions	xs:string optional	Used for managing products per geographical region. List of the regions targeted by this product, separated by semi-colons. Maximum length 3000 characters. A region may not be duplicated in the list. Allowed individual values are listed in the CMS mapping table TYPES.Regions (see [5]) and this configuration can be adapted on-site. An empty value means the product is targeted to all regions, without having to list them. Eg: "France;Belgium"
isSOCU	xs:Boolean optional	Flag used to determine if the broadcast product is concerning Start Over/CatchUp contents. If not present at product creation time, the value will be false. If not present on product update, the value is keep unchanged.
validityStart	gmtdatetime optional	See §3.14 Defines the start of period that this product is valid. Access granted by this product is not available before this time. Only applies to subscriptions, where it is mandatory
validityEnd	gmtdatetime optional	See §3.14 Defines the end of period that this product is valid. Access granted by this product is not available after this time. Only applies to subscriptions, where it is mandatory.
purchaseStartOffset	xs:integer Mandatory	Used to define the start of the period during which this product may be purchased. A number of seconds.
purchaseEndOffset	xs:integer Mandatory	Used to define the end of the period during which this product may be purchased. A number of seconds.

Table 9 <Product> attributes details		
Name	**Type**	**Description and typical value**
purchaseEndAnchor	OffsetAnchorEnumType optional	See § 3.18 Specifies if the end offset is added to the event's start or end to calculate the end of the purchase time window. Only applies to event PPV, where it is mandatory.
previewTimeOffset	xs:integer optional	Specifies the number of seconds of preview time (free viewing) that is allowed at the start of the programme. A non-negative integer value. Maximum value is 3599 corresponding to 59 minutes + 59 seconds. Only applies to event PPV, where it is mandatory.
productCategoryRef	xs:string optional	"Public Id of the product category. If specified, and the product "price" attribute is not specified, for a new product, the product price will be the one of the product category. If specified, and the product "price" attribute is not specified, for an old product, the product price will not be that of product category. If specified, and the product "price" attribute is specified, the product price will not be the one of the product category.
platformName	xs:string optional	"Platform name for which the content is available". If given the value, it will be linked to BTV Products and subscriptions. If the value is null, it will retain the old value for the element. If value is <Empty>, it will unlink the existing value. If the attribute is not given, no more processing for this element.

The id attribute is used to identify existing products in the CMS database.

The **title attribute** is intended to be used in billing the end user's purchase. For a multi-locale customer project the appropriate <EpgElement> should be used to carry the product's billing title in each language, see Product EPG fields in [5].

The currencies used by the CMS are defined by the configuration of the project, and files containing a non-configured currency will be rejected as errors.

When updating an existing product, if attribute "regions" is not present in the imported file, the existing value for this field in the database is preserved.

The type of an existing product cannot be changed.

Child <EpgDescription> elements (see § 3.10) are included inside <Product> to specify additional meta-data values of the product. See Product EPG fields in [5] for the list of possible fields.

Child <CasInfo> element (see §3.7) may be included inside <Product> to link it with a CAS security device. Product without a <CasInfo> element defines a Product for OTT platform.

Child <RemoveFromProduct> and <AddToProduct> elements (see § 3.8) should be present as appropriate to link the product to the item(s) it sells.

The following sections provide usage rules that are specific to the different types of products.

3.6.3 Subscription usage rules

Attribute type is "subscription".

Attributes validityStart and validityEnd must be provided and define the period that this subscription provides access to the linked channels. validityStart must be strictly before validityEnd.

The subscription product's purchase window is defined by ***subtracting*** the period defined by purchaseStartOffset from validityStart to give the purchase window start. Similarly the purchase window end is obtained by subtracting purchaseEndOffset from validityEnd. The values must be such that the resulting purchase window start is strictly before the purchase window end.

Generally these offsets will be set to zero or positive, so that the sale window is either the same as the validity period, or starting and ending before the limits of the validity. Although there is not much business sense in having negative offset values, the CMS does allow it for the start offset. A negative value for the end offset that would result in the sale window end being after the validity end will raise an error

The attributes purchaseEndAnchor and previewTimeOffset should not be provided; if they are their values are ignored.

In the child <RemoveFromProduct> and <AddToProduct> elements, the value of the attribute elementKind must always be "service", and attribute elementId will be the ID of a channel version existing the CMS.

<RemoveFromProduct> elements are only relevant when updating an existing subscription product. They are used to unlink a channel version that was previously included in the subscription. Following such updates the subscription no longer provides access to the programmes of this channel.

<AddToProduct> elements are used to link a channel version to the subscription product. The referenced channel must already exist in the CMS database.

For CAS subscriptions, all the channel versions it sells must be linked to the same CAS security device, which is the same one the product is linked to.

It is permitted (although not very useful) for subscription products to have no channels linked to them.

The import handles the links between subscription products and channels in an incremental way. That is links that already exist in the CMS database, and that are not explicitly referenced in an import file will be preserved. In this way the data provider only needs to provide subscription data when changes occur, it is not necessary to list all the channels to which the subscription applies in every import file.

In order to force the full synchronization of a subscription product, a product delete command (see § 3.6.5) *followed* by a <Product> element listing all the channels it sells in child <AddToProduct> elements can be provided in the same xml file. This combination will force the previous product definition to be deleted from the CMS database and new entries inserted. Which in turn (for CAS products) will force a re-synchronisation with the CAS.

3.6.3.1 Backward compatibility with CMS4.2

For CMS4.2 subscription products were defined by being linked to a main channel. This had a particular impact on the definition of OTT products. For CMS4.2 an OTT subscription applied to all the scrambled OTT delivery paths of the business channel. As a result, subscriptions selling unscrambled OTT channels were not supported.

Starting from CMS4.3, in the xml file subscription definitions should refer to the ID's of channel versions. However the CMS4.2 behaviour will be replicated if the <RemoveFromProduct> and <AddToProduct> reference a main channel if the following way:

- A CAS product will be linked to / unlinked from the channel version of the referenced main that is linked to the same CAS security device. When adding links an error is raised if no such channel version exists.
- An OTT product will be linked to / unlinked from all the OTT channel versions of the referenced main that are linked to any DRM security device. When adding links an error is raised if no such channel version exists.

3.6.4 Single event PPV usage rules

Attribute type is "single".

The attributes validityStart and validityEnd should not be provided, if they are their values are ignored. It is the scheduled start and end time of the corresponding programme that define the product's validity.

The PPV product's purchase window is defined by ***subtracting*** the period defined by purchaseStartOffset from the linked programme's start time to give the purchase window start. This offset should be zero or positive, otherwise viewers will miss the start of the programme.

Attribute purchaseEndAnchor must be provided and defines how the purchase window end is calculated:

start — purchase window end is obtained by subtracting purchaseEndOffset from the programme's start time. For this case the offset will usually be a negative value.

end — purchase window end is obtained by subtracting purchaseEndOffset from the programme's end time. For this case the offset will usually be a positive value.

The values must be such that the resulting purchase window start is strictly before the purchase window end and that the purchase window end is before or the same as the validity end.

Attribute previewTimeOffset must be provided. It specifies the number of seconds of preview time (free viewing) that is allowed at the start of the programme, i.e. how long a user who has not purchased the PPV may view the programme before access is stopped.

In the child <RemoveFromProduct> and <AddToProduct> elements, the value of the attribute elementKind must always be "programme", and attribute elementId will be the ID of:

- a programme existing in the CMS database when the xml file contains only <Product> elements
- a programme included in the same data file when it contains both <DownloadPeriod> and <Product> elements.

See also attribute "id" of <Programme> § 3.5.

The start time of all referenced events must be in the future, specifically the start time of events must be on or after the end of the danger zone.

CAS PPV products may only be created if the event's channel has a version that is linked to the same CAS.

OTT PPV products may only be created if the event's channel has at least one OTT version.

PPV products must be linked to exactly one programme. Unlike subscription products, the link is not managed incrementally and therefore one <AddToProduct> element is mandatory to specify the programme that the PPV sells.

<RemoveFromProduct> elements are only relevant when updating an existing PPV product. They are used to unlink the PPV product from a programme allowing it to be linked to a different one.

When it is needed to change the link between a product and its programme, <RemoveFromProduct> must be present referring to the old programme and <AddToProduct> with the new programme in the same xml file.

3.6.5 Deleting products

When using **action="delete"** in a <Product> to remove products from the CMS database, the import algorithm will only take into account the attributes "id".

The existing product referenced by the specified "id" must be a BTV product, and if it is a CAS product, the CAS security device must in the configuration of authorized devices.

The other mandatory fields must be present so that the XML file is valid, but their values are all ignored.

Similarly any child <EpgDescription>, <RemoveFromProduct> and <AddToProduct> elements are silently ignored.

Requesting to delete a product that does not exist in the CMS database is not considered an error. In this case an information log message will simply be reported.

Deletion of single event PPV products is only allowed for events whose start time is on or after the end of the danger zone.

It is not necessary to explicitly unlink channels from a subscription product before deleting that product.

Since PPV products are automatically deleted when their event is deleted, it is not necessary to include a <Product> element with delete action when the event is being deleted.

3.7 Element <CasInfo>

The element <CasInfo> within <Product> is defined by the type CasInfoType:

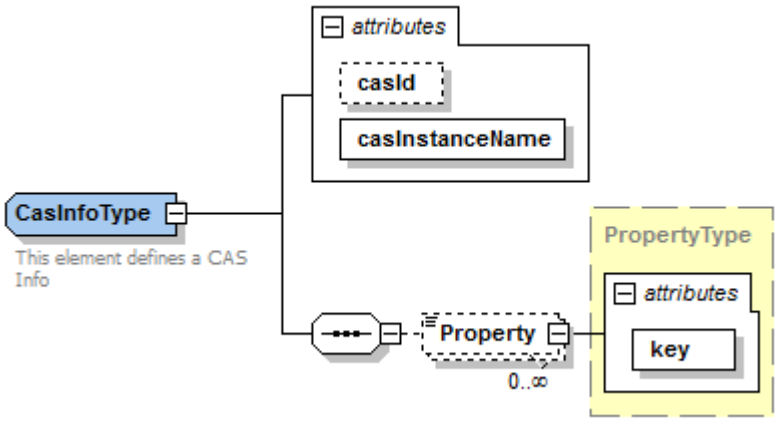


Table 10 <CasInfo> attributes details		
Name	**Type**	**Description and typical value**
casId	xs:string optional	The identifier of this product within the CAS. This is the technical ID for all conditional access related operations. Max length 50 characters. For the Nagra CAS this ID is a positive integer value with maximum 12 digits.
casInstanceName	xs:string mandatory	The name that uniquely identifies the CAS server managing access to the channels or event sold by this product. The corresponding CAS security device must

		already exist in the CMS database. Will be unique amongst all devices. May not start or end with whitespace. Maximum length is 300 characters.

Products for OTT platforms do not have a **<CasInfo>** element.

The **casInstanceName** attribute must match the corresponding CMS CAS security device object. Synchronisation of the configuration of these names is out of the scope of this interface.

A configuration parameter of the CMS import algorithm defines the names of the devices the data provider is authorized to use. Attempts to create, update or delete products that are attached to a CAS device that the data provider is not authorized to use will raise an error and cause the import to fail. The access restriction does not apply to OTT products so all data providers have full access to all OTT products.

If the configuration parameter of the CMS import algorithm doesn't defines the names of the devices the data provider is authorized to use (is empty) then the access restriction does not apply.

When a <CasInfo> information has been set in a previous import, it can be updated or removed. All attributes can be updated by providing a new value. To delete a <CasInfo> information, the casInstanceName attribute must be provided with an empty value (in that case, casId attribute is ignored if provided).

The **casID** value should be unique within the CAS/DRM security devices, but this rule does not apply to HybridCASDevices.

This element provides a container in order to supply a set of metadata using the `<Property>` child element.

3.8 Elements <RemoveFromProduct>, <AddToProduct>

The elements <RemoveFromProduct>, <AddToProduct> within <Product> are defined by the type MarketableReferenceType:

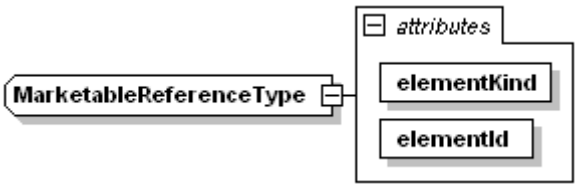


Table 11 <RemoveFromProduct>, <AddToProduct> attributes details		
Name	**Type**	**Description and typical value**
elementKind	MarketableEnumType mandatory	See § 3.16. The kind of item referenced by a product E.g. "programme"

Table 11 <RemoveFromProduct>, <AddToProduct> attributes details		
Name	**Type**	**Description and typical value**
elementId	IdType mandatory	See § 3.15 The identifier of the item referenced by a product. Maximum length 50 characters.

In the following situations <RemoveFromProduct> / <AddToProduct> elements would have no effect on the CMS database. These cases are not considered as an error (i.e. they will not cause the import to fail), however information message will be logged to trace that an element of an input file was ignored:

- <RemoveFromProduct> elements present when creating a new product.
- <RemoveFromProduct> element for a programme/channel when the link does not exist in the CMS database.
- <RemoveFromProduct> element for a programme/channel that does not exist in the CMS database.
- <AddToProduct> element for a channel when the link to the subscription product already exists in the CMS database.

The usage rules of these elements are dependent upon the type of product. See § 3.6.3 and § 3.6.4.

When updating an existing product a <RemoveFromProduct> element for the same programme/channel as an <AddToProduct> will cause the linking data entry in the CMS database to be deleted and re-created. When applied on a CAS subscription product, this will force the re-synchronisation of the product with the CAS.

3.9 Element <Period>

The <Period> elements within <DownloadPeriod> and <Programme> are defined by the type PeriodType:

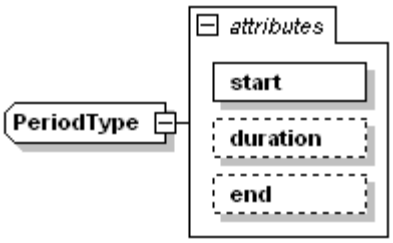


Table 12 <Period> attributes details		
Name	**Type**	**Description and typical value**
start	gmtdatetime mandatory	See § 3.14. Date and time of the start of the period E.g. "2011-07-31T22:00:00Z"
duration	xs:int optional	Duration of the period in seconds. A positive integer.
end	gmtdatetime optional	See § 3.14. Date and time of the end of the period E.g. "2011-08-01T22:00:00Z"

This element defines a period of time.

This element has no payload.

This element is designed to give the user the choice of specifying the period by either start & duration or by start & end. So it is mandatory for one of duration or end to be present.

When "end" is specified, it must be strictly after "start".

When both duration and end are present they must be coherent, i.e. duration must contain the number of seconds between the specified start and end timestamps.

3.10 Element <EpgDescription>

The <EpgDescription> elements within <Series>, <Content>, <Product> and <Programme> are defined by the type EpgDescriptionType:

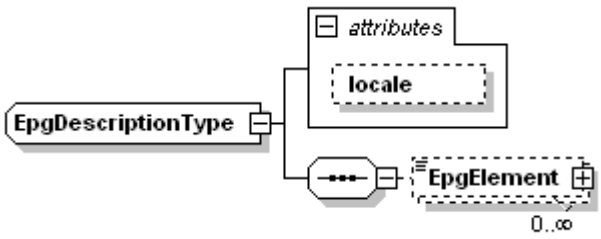


Table 13 <EpgDescription> attributes details		
Name	**Type**	**Description and typical value**
locale	xs:string optional	The locale in which the EPG texts are written. 5 chars.

This element provides a container for supplying a set of generically defined data values. Each value is defined as a keyword – value pair in a <EpgElement> child element. Data values can be classified into two groups:

- Textual items that are translated into more than one language, typically titles and synopsis
- The rest – where the raw data value is language independent, for example parental rating code, production year.

Within a parent element, there will be one <EpgDescription> element for each language to carry the data from the first group, with the language specified by the locale attribute. All the text elements within such an <EpgDescription> element should be supplied in that language.

All the data values of the second group are supplied together in one <EpgDescription> element, and here the locale attribute must be omitted.

Reference document [5] provides the details of all the available fields, including which are localized. The fields that are defined to be localized must be given within an <EpgDescription> that specifies the "locale" attribute, and the non-localised ones must be supplied in the <EpgDescription> without attribute "locale". The CMS's import process will raise and error and reject the soure xml if this is not respected.

The locale attribute value is the concatenation of a language code and a county code, separated by an underscore. The locales used by the CMS are defined by the configuration of the project, and files containing a non-configured locale will be rejected as errors.

The language code uses ISO-639-1 2 letter language codes (lower case) that can be found in in reference ISO-639-2 [3].

The country code is taken from ISO 3166-1 [4] and is a 2 letter code in uppercase.

For example:

'en_GB' for British English, 'en_US' for American English or 'fr_FR' for standard French.

When updating an existing programme, or product only the EPG data values specified in the import file are modified in the database. For example if the CMS database already contains a value for EPG field "XYZ", but no entry is given in the import file the value in the database is preserved.

3.11 Element <EpgElement>

The <EpgElement> elements within <EpgDescription> are defined by the type EpgElementType:

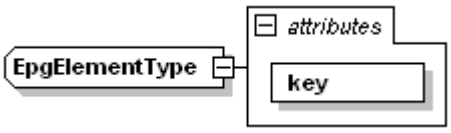


Table 14 <EpgElement> attributes details		
Name	**Type**	**Description and typical value**
key	xs:string mandatory	Key word specifying the data field whose value is carried in the payload of this element.

This element supplies one value for one generic data field of its parent <EpgDescription>'s parent element. The data field concerned is specified by the key attribute. The set of allowed keys are dependent upon the context, i.e. the type of parent of the <EpgDescription>, and are defined in reference document [5].

If an EpgElement is present with a key name that does not match the ones configured in the CMS system, a warning message will be displayed, the data of this element will be ignored and processing of the rest of the file continue normally.

The data payload of this element is the data field's value. Allowed values are dependent upon the key and the context, the usage rules are also defined in reference document [5].

The data payload may be empty, corresponding to specifying a "null" value for the field, which will effectively delete the field value from the CMS database.

3.12 Element <Property>

The <Property> elements within <CasInfo> and <DrmInfo> are defined by the type PropertyType:

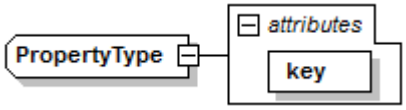


Table 15 <Property> attributes details		
Name	**Type**	**Description and typical value**
key	xs:string mandatory	Key word specifying the data field whose value is carried in the payload of this element.

This element provides metadata information related to the parent XML element using a key-value format. The value of the property corresponds to the element body.

The element's payload may be empty, corresponding to a "null" value for the metadata, which will effectively delete the metadata value from the Media Live CMS database if it exists.

The list of allowed keys and their format are defined in [5].

The key attribute must exactly match one of the allowed metadata configured in the Media Live CMS database. Unknown metadata are considered as errors.

3.13 Simple type ActionType

This type is an enumeration of string that can have the following values:

delete
override

This type is used as an attribute that controls the behaviour of the CMS import with respect to XML files containing data already supplied in previous files.

The action **delete** allows the file producer to specify the referenced element no longer exists.

The action **override** (default behaviour if the action attribute is not present) specifies that the CMS should create the data element if it does not already exist or to update existing elements.

The id attribute of the xml element is used to identify the concerned data item.

3.14 Simple type gmtdatetime

This type is used to specify a GMT date & time, the syntax is

```
yyyy-mm-ddThh:mm:ssZ
```

Where the dashes, colons and T & Z characters are mandatory field separators.

In terms of schema validation this type is a restriction of string, with the following pattern applied:

[0-9][0-9][0-9][0-9]-[0-1][0-9]-[0-3][0-9]T[0-2][0-9]:[0-6][0-9]:[0-6][0-9]Z

3.15 Simple type IdType

This type is used to specify an object identifier.

The identifier is a non-empty alpha-numeric string. Underline, dot and dash characters are also allowed. No whitespace is permitted.
In terms of schema validation this type is a restriction of string, with the following pattern applied:

[a-zA-Z0-9_\.\+]+[a-zA-Z0-9_\-\.\+]*

Note that identifiers that start with an underline or dash character are reserved for the CMS's internal use and may not be used in this interface. In the CMS data model identifiers have a maximum length of 50 characters.

3.16 Simple type MarketableEnumType

This type is used to specify the kind of item being linked to or unlinked from a product. It is an enumeration of string that can have the following values:

programme
service

3.17 Simple type ProductEnumType

This type is used to specify the type of a product. It is an enumeration of string that can have the following values:

single
subscription

Single products reference only one broadcast event.

Subscription products reference one or more channels (Bouquet), and give access to all the programmes of all these channels.

3.18 Simple type OffsetAnchorEnumType

This type is used to specify if an offset value is applied to the start or end of a period. It is an enumeration of string that can have the following values:

start
end

4. Error file format

In the case where the CMS import process detects an error causing it to reject the input xml file an error file with the same name as the source file and an ".error" extension will be generated and written in the acknowledgement failure directory.

The error file is an XML file with the following structure

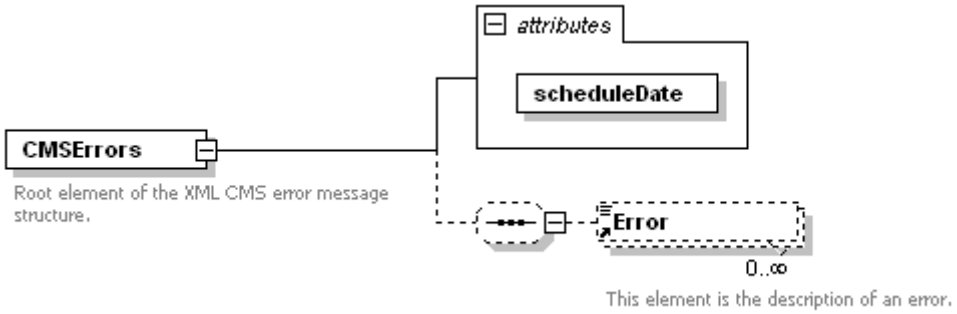


Table 16 <CMSErrors> attributes details		
Name	**Type**	**Description and typical value**
scheduleDate	gmtdatetime Mandatory	See § 3.14. Provides a reference date for the error XML file. Will be the date and time that the CMS generates the file. Eg "2011-08-04T08:15:58Z"

The child <Error> elements have type "xs:string", with undefined maximum length. Multiple <Error> elements may be supplied, one for each error detected.

4.1 Error file sample

```
<?xml version="1.0" encoding="UTF-8"?>
<CMSErrors scheduleDate="2012-01-23T12:42:31Z">
    <Error>[EPG Unit (starting at: [ Sun Jan 22 18:00:00 GMT 2012])] Programme
title validation: There are leading or trailing spaces in the supplied value "
+Gente"
    </Error>
    <Error>[EPG Unit (starting at: [ Wed Feb 29 22:55:00 GMT 2012])] Programme
title validation: There are leading or trailing spaces in the supplied value "
Jackass 3"
    </Error>
</CMSErrors>
```

4.2 Error file xsd schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified">
   <xs:element name="CMSErrors">
      <xs:annotation>
         <xs:documentation>Root element of the XML CMS error message structure.
         </xs:documentation>
      </xs:annotation>
      <xs:complexType>
         <xs:sequence minOccurs="0">
              <xs:element ref="Error" minOccurs="0" maxOccurs="unbounded"/>
         </xs:sequence>
         <xs:attribute name="scheduleDate" type="gmtdatetime" use="required"/>
      </xs:complexType>
   </xs:element>
   <xs:element name="Error">
      <xs:annotation>
         <xs:documentation>This element is the description of an error.
         </xs:documentation>
      </xs:annotation>
      <xs:complexType>
         <xs:simpleContent>
              <xs:extension base="xs:string"/>
         </xs:simpleContent>
      </xs:complexType>
   </xs:element>
   <xs:simpleType name="gmtdatetime">
      <xs:annotation>
         <xs:documentation>A ISO 8601 compatible gmt datetime
                           Format : yyyy-mm-ddThh:mm:ssZ
         </xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:string">
         <xs:pattern value="[0-9][0-9][0-9][0-9]-[0-1][0-9]-[0-3][0-9]T[0-2][0-
9]:[0-6][0-9]:[0-6][0-9]Z"/>
      </xs:restriction>
   </xs:simpleType>
</xs:schema>
```

Acronyms

Acronym	Stands for	Definition
ASCII	American Standard Code for Information Interchange	The most popular coding method used by small computers for converting letters, numbers, punctuation and control codes into digital form. ASCII is a 7-bit character set encoding that contains characters for uppercase and lowercase English, American English
BTV	Broadcast TeleVision	
CAS	Conditional Access System	The set of features (and the components that implement them) which provide selective access to broadcast services on a per-subscriber basis. See conditional access.
CAS	Conditional Access System	The overall security system for providing and preventing access to digital interactive television system. It is composed of an IMS, ciphering units and a CA/DRM Server.
CMS	Content Management System	Backend system managing content, traffic and scheduling data
DRM	Digital Rights Management	Umbrella term to cover all sorts of active or passive mechanisms controlling the availability of locally stored digital content
DVB	Digital Video Broadcasting	Consortium of companies establishing common international standards for digital broadcasting
EPG	Electronic Program Guide	Depending on the context, refers either to the set-top box application providing a display of the channel schedule on the subscriber TV screen, or either to the whole schedule process: schedule information building in the IMS, transmission on the network
FTP	File transfer protocol	Standard Internet protocol and application to transmit files between machines. FTP uses the TCP/IP protocols. FTP is commonly used to transfer Web pages from their creator to the computer that acts as their server for everyone on the Internet.
GMT	Greenwich Mean Time	Today called Coordinated Universal Time (UTC). Reference time for CAS.
GUI	Graphical User Interface	Graphical (rather than purely textual) user interface to a computer
ID	Identifier	Unique value associated to an element to identify it.
IMS	Information management system	Part of the CAS that is responsible for EPG and ECM stream generation, schedule, topology, product and access conditions management. IMS industry name: Event Information Schedule (EIS).
ISO	International Organization for Standardization	ISO edicts norms about everything. For CAS, used norms concern in particular language and country codes.
NDA	Non-Disclosure Agreement	A legal contract between at least two parties that outlines confidential material, knowledge, or information that the parties wish to share with one another for certain purposes, but wish to restrict access to by third parties

OTT	Over The Top	On-line delivery of video and audio over IP without the Internet service provider being involved in the control or distribution of the content itself. Consumers can access OTT content through Internet-connected devices.
PPV	Pay Per View	CAS feature allowing subscribers to purchase one-time viewing events or group of events. There are two types of PPV: pre-booked PPV and impulse PPV.
SI	Service information	DVB defined extensions to the MPEG-2 PSI tables which provide service content and scheduling information.
UTF-8	UCS Transforming Format 8	UTF-8 is an alternative coded representation form for all the characters of the UCS. It can be used to transmit text data through communication systems which assume that individual octets in the range 00 to 7F have a definition according to ISO/IEC 4873. UTF-8 is a good way to go for using Unicode under Unix-style operating systems.
VOD	Video On Demand	umbrella term for a wide set of technologies whose common goal is to enable individuals to select video streams from a central server for viewing on a television or computer screen
XML	eXtensible Markup Language	XML is standard language used to create extensible data structures (XML schemas) and documents compatible with these structures (XML documents). Allows designers to create their own customized tags, enabling the definition, transmission, validation, and i

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