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Foreword

The DVB Project is an industry-led consortium of broadcasters, manufacturers, network operators, software developers, regulators and others from around the world committed to designing open, interoperable technical specifications for the global delivery of digital media and broadcast services. DVB specifications cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. The consortium came together in 1993.

Modal verbs terminology

In the present document "shall", "shall not", "should", "should not", "may", "need not", "will", "will not", "can" and "cannot" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"must" and "must not" are NOT allowed in ETSI deliverables except when used in direct citation.

Introduction

DVB-I represents the intersection of linear broadcast television and internet media streaming, offering the possibility for linear television services to be delivered to internet connected devices. The present document defines the mechanisms to be used to find sets of linear television services delivered through broadband or broadcast mechanisms as well as methods to retrieve electronic programme data for those services.
1 Scope

The present document defines the following:

- signalling of linear TV or radio services and content that are delivered over broadband;
- access linear TV services that are delivered by broadband in a way that is consistent with their access to linear TV services delivered by RF-based DVB technologies;
- the metadata and mechanisms to present electronic programme guides;
- the integration of linear services delivered by the RF-based DVB tuner and linear services delivered by broadband into a single coherent offering that is accessed through a single consistent UI; and
- a method for national TV regulators or their representatives, operators and trademark licensors to offer a list of trusted/legitimate/authorized/regulated services.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 103 285: "Digital Video Broadcasting (DVB); MPEG-DASH Profile for Transport of ISO BMFF Based DVB Services over IP Based Networks".

[2] CI Plus™ specification (V1.3.2): "Content Security Extensions to the Common Interface".

[3] IETF RFC 4151: "The 'tag' URI Scheme".

[4] ETSI TS 102 034: "Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks".

[5] ETSI TS 102 809: "Digital Video Broadcasting (DVB); Signalling and carriage of interactive applications and services in Hybrid broadcast/broadband environments".


[7] ETSI TS 102 822-3-1: "Broadcast and On-line Services: Search, select, and rightful use of content ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 - Metadata schemas".


NOTE: Available at http://earth-info.nga.mil/GandG/publications/tr8350.2/wgs84fin.pdf

ETSI TS 101 162: "Digital Video Broadcasting (DVB); Allocation of identifiers and codes for Digital Video Broadcasting (DVB) systems".

void.

IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

IETF RFC 9110: "HTTP Semantics".

IETF RFC 9111: "HTTP Caching".

ETSI TS 102 851: "Digital Video Broadcasting (DVB); Uniform Resource Identifiers (URI) for DVB Systems".

ISO 639-2: "Codes for the representation of names of languages -- Part 2: Alpha-3 code".

ISO 639-3: "Codes for the representation of names of languages -- Part 3: Alpha-3 code for comprehensive coverage of languages".

ISO 8601-1: "Date and time -- Representations for information interchange -- Part 1: Basic rules".

ISO/IEC 15938-5: "Information technology -- Multimedia content description interface -- Part 5: Multimedia description schemes".

ETSI TS 102 796: "Hybrid Broadcast Broadband TV".

ETSI TS 101 154: "Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcast and Broadband Applications".


void.


IETF RFC 1918: "Address Allocation for Private Internets".

ETSI TS 102 323: "Digital Video Broadcasting (DVB); Carriage and signalling of TV-Anytime information in DVB transport streams".

W3C Recommendation: "HTML 5.1 2nd Edition".

NOTE: Available at https://www.w3.org/TR/html51/.

IETF RFC 5646: (BCP 47) "Tags for Identifying Languages".

IETF RFC 2397: "The 'data' URL Scheme".

ETSI TS 103 205: "Digital Video Broadcasting (DVB); Extensions to the CI Plus™ Specification".

CI Plus Specification v1.4.4 (2021-09): "Content Security Extensions to the Common Interface".

DVB A184: "Implementation Guidelines for DVB-I".

ETSI EN 302 307-2: "Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications; Part 2: DVB-S2 Extensions (DVB-S2X) ".
ISO/IEC 13818-6: "Information technology -- Generic coding of moving pictures and associated audio information -- Part 6: Extensions for DSM-CC".

ETSI EN 301 192: "Digital Video Broadcasting (DVB); DVB specification for data broadcasting".

IETF RFC 7595: (BCP 35) "Guidelines and Registration Procedures for URI Schemes".

ETSI TS 126 346: "Universal Mobile Telecommunications System (UMTS); LTE; 5G; Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

ETSI TS 126 347: "LTE; Multimedia Broadcast/Multicast Service (MBMS); Application Programming Interface and URL".

CTA-5000: "Web Application Video Ecosystem – Web Media API Snapshot".

# 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TS 103 769: "Digital Video Broadcasting (DVB); Adaptive media streaming over IP multicast".

[i.2] EN 50494: "Satellite signal distribution over a single coaxial cable in single dwelling installations" (produced by CENELEC).

[i.3] EN 50607: "Satellite signal distribution over a single coaxial cable - Second generation" (produced by CENELEC).

[i.4] List of EU Audiovisual Regulators - Audiovisual and Media Services Directive (AVMSD).


[i.5] W3C Recommendation: "Encrypted Media Extensions".

NOTE: Available at https://www.w3.org/TR/encrypted-media/.

[i.6] W3C Recommendation: "XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes".

NOTE: Available at https://www.w3.org/TR/xmlschema11-2/.


NOTE: Available at https://www.w3.org/TR/xmlschema11-1/.

[i.8] ISO 3166: "Country Codes".

[i.9] ETSI TS 101 547-2: "Digital Video Broadcasting (DVB); Plano-stereoscopic 3DTV; Part 2: Frame Compatible Plano-stereoscopic 3DTV".

[i.10] ETSI TS 101 547-4: "Digital Video Broadcasting (DVB); Plano-stereoscopic 3DTV; Part 4: Service frame compatible Plano-stereoscopic 3DTV for HEVC coded services".
Digital UK: "Freeview Play Business-to-Consumer Metadata Specification".

NOTE: Additional information is available at https://www.freeview.co.uk/corporate/platform-management/what-we-do.

CTA-5001-B: "Web Application Video Ecosystem – Content Specification".

IETF RFC 8216: "HTTP Live Streaming".

CTA-5005: "Web Application Video Ecosystem – DASH-HLS Interoperability Specification".


3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI TS 103 285 [1] and the following apply:

**DVB-I client:** implementation of the client side of the present document

NOTE: This may be integrated into the User Interface (UI) of a device such as a television or set-top box or part of an app on devices such as mobile phones or tablets.

**DVB-I service:** any service which is discovered using the mechanisms defined in the present document, and which is available using one or more delivery systems including at least DVB-DASH (ETSI TS 103 285 [1]) as well as traditional DVB broadcast

**DVB-I service instance:** single delivery mechanism with related information for the audiovisual content in a DVB-I service.

**Access service:** service that provides user interface enhancements to assist users with disabilities, or who may temporarily be unable to fully interact with a device.

**Boxset:** a set of programs that have common traits which associate them together with the intention to be presented as a collection.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

<table>
<thead>
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABNF</td>
<td>Augmented Backus-Naur Form</td>
</tr>
<tr>
<td>ABR</td>
<td>Adaptive Bit Rate</td>
</tr>
<tr>
<td>AES</td>
<td>Advanced Encryption Standard</td>
</tr>
<tr>
<td>AIT</td>
<td>Application Information Table</td>
</tr>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>ASCII</td>
<td>American Standard Code for Information Interchange</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>---------</td>
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<tr>
<td>AVC</td>
<td>Advanced Video Coding</td>
</tr>
<tr>
<td>BAT</td>
<td>Bouquet Association Table</td>
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<td>CA</td>
<td>Conditional Access</td>
</tr>
<tr>
<td>CBC</td>
<td>Cypher Block Chaining</td>
</tr>
<tr>
<td>CCM</td>
<td>Constant Coding and Modulation</td>
</tr>
<tr>
<td>CDN</td>
<td>Content Delivery Network</td>
</tr>
<tr>
<td>CGSID</td>
<td>Content Guide Source Identifier</td>
</tr>
<tr>
<td>CI</td>
<td>Common Interface</td>
</tr>
<tr>
<td>CICAM</td>
<td>Common Interface Conditional Access Module</td>
</tr>
<tr>
<td>CRID</td>
<td>Content Reference Identifier</td>
</tr>
<tr>
<td>CS</td>
<td>Classification Scheme</td>
</tr>
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<td>CSR</td>
<td>Central SLR</td>
</tr>
<tr>
<td>DASH</td>
<td>Dynamic Adaptive Streaming over HTTP</td>
</tr>
<tr>
<td>DLNA</td>
<td>Digital Living Network Alliance</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name System</td>
</tr>
<tr>
<td>DRM</td>
<td>Digital Rights Management</td>
</tr>
<tr>
<td>DVB-C</td>
<td>Digital Video Broadcasting - Cable</td>
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<tr>
<td>DVB-I</td>
<td>Digital Video Broadcasting - Internet</td>
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<tr>
<td>DVB-S</td>
<td>Digital Video Broadcasting - Satellite</td>
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<tr>
<td>DVB-SI</td>
<td>Digital Video Broadcasting - Service Information</td>
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<tr>
<td>DVB-T</td>
<td>Digital Video Broadcasting - Terrestrial</td>
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<td>EBU-TT</td>
<td>European Broadcasting Union-Timed Text</td>
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<tr>
<td>EIT</td>
<td>Event Information Table</td>
</tr>
<tr>
<td>EME</td>
<td>Encrypted Media Extensions</td>
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<tr>
<td>EPG</td>
<td>Electronic Programme Guide</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FEC</td>
<td>Forward Error Correction</td>
</tr>
<tr>
<td>FEPI</td>
<td>Forward Electronic Program Guide</td>
</tr>
<tr>
<td>FM</td>
<td>Frequency Modulation</td>
</tr>
<tr>
<td>FTA</td>
<td>Free To Air</td>
</tr>
<tr>
<td>GIF</td>
<td>Graphics Interchange Format</td>
</tr>
<tr>
<td>HbbTV®</td>
<td>Hybrid Broadcast Broadband Television</td>
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</tbody>
</table>

**NOTE:** HbbTV® is a registered trademark of HbbTV Association.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>HD</td>
<td>High Definition</td>
</tr>
<tr>
<td>HDI</td>
<td>High-Definition Multimedia Interface</td>
</tr>
<tr>
<td>HDR</td>
<td>High Dynamic Range</td>
</tr>
<tr>
<td>HEVC</td>
<td>High Efficiency Video Coding</td>
</tr>
<tr>
<td>HLS</td>
<td>HTTP Live Streaming</td>
</tr>
<tr>
<td>HTML</td>
<td>HyperText Markup Language</td>
</tr>
<tr>
<td>HTTP</td>
<td>HyperText Transfer Protocol</td>
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<tr>
<td>HTTPS</td>
<td>HyperText Transfer Protocol Secure</td>
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<tr>
<td>ID</td>
<td>Identifier</td>
</tr>
<tr>
<td>IETF</td>
<td>Internet Engineering Task Force</td>
</tr>
<tr>
<td>IGMP</td>
<td>Internet Group Management Protocol</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>IPTV</td>
<td>Internet Protocol Television</td>
</tr>
<tr>
<td>ISAN</td>
<td>International Standard Audiovisual Number</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<tr>
<td>ISP</td>
<td>Internet Service Provider</td>
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<tr>
<td>JPEG</td>
<td>Joint Photographic Experts Group</td>
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<tr>
<td>LCN</td>
<td>Logical Channel Numbering</td>
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<td>LNB</td>
<td>Low Noise Block</td>
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<td>MBMS</td>
<td>Multimedia Broadcast Multicast Service</td>
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<td>MIME</td>
<td>Multipurpose Internet Mail Extensions</td>
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<tr>
<td>MPD</td>
<td>Media Presentation Description</td>
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</table>
4 Architecture and System Considerations

4.1 DVB-I components and interfaces

Figure 1 below shows a simplified view of DVB-I components and the interfaces between them. Some missing elements include:

- CDNs;
service list server discovery;
encoding of the video and audio streams;
distributing video and audio streams from the content/service provider to the stream servers; and
integration with classical DVB cable, satellite and terrestrial broadcasting.
Here is more detail on the components and interfaces.

- **DVB-I client**: A DVB-I client, see clause 3.1.

- **Service List Registry**: A function that provides the DVB-I client with a list of Service List Entry Points based on the provided query parameters (if any).

- **Service List Server(s)**: One or more servers delivering Service Lists to a DVB-I client. An individual Service List Server may host Service Lists from multiple Service List Providers. An individual Service List may contain Services from multiple Content/Service Providers.

  NOTE 1: This is only one of 3 possible phases of service aggregation. A DVB-I client may offer a choice of Service List Servers or may aggregate Service Lists from multiple Service List Servers, see clause E.2. Some devices may support multiple instances of the DVB-I client.

- **Content Guide Server(s)**: These respond to requests from a DVB-I client for content guide data. The Content Guide Server(s) for an individual Service are referenced in the Service List entry for that Service.

- **Content/Service Provider(s)**: Organizations providing Services.

- **Application Server(s)**: A server that provides applications which support the delivery of broadcast and broadband services to the DVB-I client.

- **Playlist Server(s)**: These provide the playlist for services that reference a playlist of (DVB-DASH) content items rather than directly referencing a single DASH MPD.

- **MPD Server(s)**: These provide DASH MPDs.

  NOTE 2: The MPD that is returned may be personalized to a specific end-user. This would imply additional interfaces omitted from this simple diagram for authenticating individual users or other forms of personalization.

- **Stream Server(s)**: The server, including Multicast Gateways as defined in ETSI TS 103 769 [i.1], that deliver DASH media segments to a DVB-I client.

- **A1**: Content guide query: A request from a DVB-I client to a content guide server for some content guide data. See clause 6.

- **A2**: Content guide data: Content guide data in the format defined by the present document. See clause 6.

- **B1**: Service List query: A request from a DVB-I client to a Service List Server for a Service List. The DVB-I client may ask for an entire Service List and optionally filter the Service List locally and/or provide information enabling the Service List Server to provide an already filtered list.

- **B2**: A Service List in the format defined by the present document. See clause 5.5.1.

- **C1**: Request for playlist: An HTTP GET request.

- **C2**: Playlist: A playlist in the format defined by the present document. See clause 5.2.7.

- **D1**: Request for DASH MPD: An HTTP GET request.

- **D2**: DASH MPD: DASH MPDs according to ETSI TS 103 285 [1].

- **E1**: Request for media: HTTP GET requests.

- **E2**: Unicast DASH: According to ETSI TS 103 285 [1].

- **F1**: Request to determine the entry point(s) of Service List Server(s). The request may support a query argument to perform subselection in the Service List Discovery function. See clause 5.1.3.2.

- **F2**: A list of Service List Entry Points that match the request criteria. See clause 5.3.2.
• **G1:** Request for an application or application information (AIT): HTTP GET requests.

• **G2:** Application and/or application information (AIT) according to clauses 5.2.3 and 5.2.4.

• **N1:** Content guide data: Content guide data that may be in the format defined by the present document.

• **N2:** URLs for content guide server: URLs for the content guide data for each of a content/service provider's Services to be included in the corresponding Service List entry for the Service (interface O).

• **M:** Registration of the Service List Entry Points for the Service List Servers.

• **O:** Service records: Data on the Services provided by a single content/service provider. These may be in the format for Service Lists defined by the present document.

• **P1:** Playlists: Playlists that may be in the format defined by the present document.

• **P2:** URLs for playlists: URLs for playlists to be included in the corresponding Service list entry for the Service (interface O).

• **Q1:** DASH MPDs that may be according to ETSI TS 103 285 [1].

• **Q2:** URLs for DASH MPDs to be included in either the Service List entry for a Service (interface O) or the playlist for a Service (interface P1).

• **R:** URLs for media: URLs for the media to be included in DASH MPDs. These may be defined by an operational interface, (e.g. a naming convention) rather than a technical interface.

• **S:** Provisioning of applications on servers that support the operational delivery of the service.

Interfaces A1, A2, B1, B2, C1, C2, F1 and F2 are defined in the present document. Interfaces D1, D2, E1 and E2 are required by the present document but defined in ETSI TS 103 285 [1]. Interfaces N1, N2, O, P1, P2, Q1, Q2, R and S may re-use formats defined for interfaces A1, A2, B1, B2, C1, C2, D1 and D2 but this is not required.

### 4.2 Conceptual model of a DVB-I client

Figure 2 illustrates a conceptual model of a hypothetical DVB-I client.
Here is more detail on the components.

- **Source selection UI:** Devices hosting a DVB-I client will typically have some kind of UI allowing the user to choose between one or more inputs, sources or apps. A device may support more than one DVB-I client (e.g. multiple apps). A single DVB-I client may appear in this UI as more than one input or source (e.g. with different branding and showing different Service Lists). Some inputs or sources may combine DVB-I channels with DVB-C/S/T channels and/or IPTV channels. This may be the same UI that allows users to choose inputs or sources completely unrelated to DVB-I such as HDMI or DLNA or global content providers.

- **DVB-I service selection UI:** The DVB-I client may include a UI that enables users to view a list of services and choose/change between them. Note that some DVB-I client implementations may not include such a UI and may rely on a hybrid service selection UI.

- **Hybrid service selection UI:** DVB-I services may be included in a single common service selection UI with DVB-C/S/T/IPTV channels (including potentially DVB-C/S/T services accessed via SAT>IP instead of a local tuner).

- **Service list manager:** This is responsible for discovering and querying Service List Server(s) and handling the Service List(s) that are returned (interfaces B1 and B2 in figure 1). When a DVB-I service is selected, it is responsible for instructing the service player to play the service.
• **DVB-C/S/T/IPTV service list manager:** This is the function in a DVB-C/S/T or IPTV device that obtains service lists and presents services from those lists when they are selected. Some examples of what could be included are RF channel scans, tuning to a “homing mux” and acquiring a DVB-SI SDT or obtaining the (proprietary) list of channels used by a particular IPTV technology. This may potentially include DVB-C/S/T services available via SAT>IP.

• **DVB-I content guide UI:** The DVB-I client may include a UI that enables users to access information about the content in the services included in the service selection UI. Note that some DVB-I client implementations may not include such a UI and may rely on a hybrid content guide UI.

• **Hybrid content guide UI:** Information about content carried in DVB-I services may be included in a single common content guide UI with information about content carried in DVB-C/S/T/IPTV channels (including potentially DVB-C/S/T services accessed via SAT>IP instead of a local tuner).

• **Content guide manager:** This is responsible for accessing content guide server(s) and handling the content guide data that is returned (interfaces A1 and A2 in figure 1). There is no assumption that this caches content guide data on the DVB-I client in the same way that content guide data would be cached in a broadcast device. This functionality could be fully integrated into the DVB-I content guide UI (or hybrid content guide UI) without being a separate component.

• **DVB-C/S/T/IPTV content guide manager:** This is the function in a DVB-C/S/T or IPTV device which obtains and caches content guide data for the DVB-C/S/T or IPTV channels.

• **Broadband service player:** This is responsible for the complete lifecycle of playback of a service delivered on a broadband network. It controls the DVB-DASH player, any secondary OTT players and the linked application manager as appropriate. For services where the media content is described by a playlist, this is responsible for processing the playlist.

• **Broadband service playback UI:** Playback of broadband delivered services will need some kind of UI for features like playback control within the timeshift buffer, audio track selection, subtitle control and parental access control. It may also be used to present status/response codes from the DVB-DASH player. For broadcast services, this would typically already exist and hence be outside the scope of the DVB-I client. For DVB-DASH services, this could be part of the DVB-DASH player or of the DVB-I client - the latter of these is shown here.

**NOTE:** For a hybrid DVB-I client, a better user experience may result if the same look and feel is used for UIs related to DVB-DASH service presentation/playback and UIs related to broadcast service presentation/playback. While using the same UI implementation is possible in theory, in practice this may be unrealistically complex. Alternatively a broadband service playback UI could copy the look and feel of the equivalent UI used when broadcast services are being presented.

• **DVB-DASH player:** This is responsible for playing DVB-I services where the content is delivered by DVB-DASH. This is interfaces D1, D2, E1, E2 in figure 1.

• **Secondary OTT player:** DVB-I Service Lists may include references to content that is (also) available OTT by means other than DVB-DASH. A DVB-I client may be able to interface to a player for non-DVB-DASH OTT content.

• **DVB-C/S/T/IPTV "Tuner":** This is responsible for playing DVB-C/S/T/IPTV services when these are selected. This could potentially include DVB-C/S/T services accessed via SAT>IP instead of a local tuner.

• **Linked application manager:** Where a Service includes a linked application, this is responsible for identifying if a version of the application can be presented and if so, interfacing to the appropriate engine to make the presentation happen. Note that some Services may require a linked application to be started before the video and audio of the Service are presented.

• **Linked application engine:** This is responsible for running applications linked to a Service that is being presented. For example, an HbbTV engine on a television set or an HTML5 webview on a phone or tablet or personal computer.
This model is purely informative and the architecture of an actual DVB-I client implementation may be completely different.

4.3 HTTP Requests

4.3.1 Introduction

This section describes the HTTP requests and HTTP error handling for all DVB-I endpoints: Service List Registries, Service List Servers, all Content Guide Server endpoints, Content Provider XML AIT Server/Application Server, playlists and images.

The dialogue between the DVB-I client and DVB-I service list endpoints will differ where multiple ServiceList URIs have been defined in a ServiceListOffering.

4.3.2 HTTP Request Headers

4.3.2.1 Cache-Control Headers

The DVB-I client shall follow the cache control requirements in clause 7.3.2.6 of ETSI TS 102 796 [21].

For all responses to the DVB-I endpoints listed in clause 4.1, the lifetime of responses may be defined by a Cache-Control: max-age header (as defined in IETF RFC 9111 [15]). The DVB-I client shall honour this header when present and ensure that when repeating a request, the response is retrieved from the local cache if the object has not expired. This header shall be honoured when present. The expiration may be defined dynamically by a DVB-I endpoint, so the header shall be checked on the response to each request.

If the max-age header is present, the DVB-I client shall only request updates after the duration signalled in the header has passed. In this respect, the DVB-I client is not expected to implement a predefined update frequency, but instead rely upon the expiration information to provide a dynamic update frequency per-request. The DVB-I client shall honour the max-age header, where present, while the DVB-I client is powered on, and should continue to honour the header over reboots if IP delivered metadata is cached in non-volatile storage.

Different durations of expiry may be dynamically defined by a Content Guide Server depending on the specific endpoint and query called, and potentially to adapt to server load. Different queries to a single endpoint method (for example Schedule queries for various time periods) may be assigned differing expiry durations by a DVB-I endpoint, depending on the content. These shall be honoured individually. For example, the Now/Next Schedule end-point may provide a very short max-age if the Content Guide Server is able to update the information based on dynamic content playout integration. This allows the client to poll the Now/Next schedules end-point more frequently (see clause 6.5.3.2).

Where a specific response does not include a max-age header the DVB-I client may apply its standard caching behaviour.

Example header:

Cache-Control: max-age=3600

4.3.2.2 If-Modified-Since Headers

All HTTP requests to DVB-I endpoints listed in clause 4.1 shall include an If-Modified-Since header as defined in clause 13.1.3 of IETF RFC 9110 [14], specifying the time of the last update for the specific request. In the case that the requested resource has not changed since the last update, a 304 (Not Modified) response may be returned and the DVB-I client should continue to cache the existing data. If the requested resource has changed since the last update, then a 200 (OK) response shall be returned. The body of this response shall be used to update the cached data and the Last-Modified time in the response header, if present, should be held to use in the If-Modified-Since header of future requests for the same document.
In the scenario where a previous Last-Modified time is not available (e.g. upon device boot or restart, or where not provided in a previous response) then the If-Modified-Since header shall be omitted from the request and a DVB-I endpoint shall respond as per a standard GET request.

Example header:


4.3.3 HTTP Responses

4.3.3.1 Introduction

The DVB-I endpoints listed in clause 4.1 are usually accessed by a client in a non-interactive way so this section describes the autonomous behaviour of a client when it receives the following types of HTTP response.

4.3.3.2 400 (Bad Request), 406 (Not Acceptable)

When received on a request to any DVB-I endpoint listed in clause 4.1 the DVB-I client shall not retry the same request and deem it to have failed.

4.3.3.3 401 (Authentication Required), 403 (Forbidden)

This response shall only be used where a DVB-I endpoint listed in clause 4.1 requires client authentication. The manner of authentication is outside the scope of the present document.

In the case where the request was made to a ServiceList endpoint and more than one ServiceListURI is defined in a ServiceListOffering the DVB-I client shall attempt to make a connection to the next listed URI.

When received on a request to any DVB-I endpoint, the DVB-I client shall wait the period defined by the Retry-After header of the response and then attempt to re-authenticate. If no Retry-After header is provided the DVB-I client should attempt to re-authenticate immediately.

4.3.3.4 404 (Not Found)

If a 404 (Not Found) HTTP response code is received on a request to a ServiceList Registry or ServiceList endpoint and the DVB-I client fails to acquire the Service List then it should attempt to restart service discovery and/or notify the user.

In the case where the request was made to a ServiceList endpoint, a 404 (Not Found) HTTP response code is received and more than one ServiceListURI is defined in a ServiceListOffering the DVB-I client shall attempt to make a connection to the next listed URI.

If a 404 (Not Found) HTTP response code is received on a request to any API URL listed in the ContentGuideSource object (see clause 5.5.7) then the client shall re-acquire the Service List (see clause 5.5.1), in order to re-acquire the ContentGuideSource. If a 404 (Not found) HTTP response is still received after re-acquiring the Service List the receiver shall use the back-off timing model described in clause 4.3.3.7. If the DVB-I client fails to acquire the Service List then it should attempt to restart service discovery and/or notify the user.

If a 404 (Not Found) HTTP response code is received on a request to an image server, playlist server or Content Provider XML AIT server the DVB-I client shall not retry the request and deem it to have failed.

4.3.3.5 500 (System Error), 502 (Bad Gateway), 504 (Gateway Timeout), Connection Failure

When occurring on any request to any DVB-I endpoint listed in clause 4.1 the DVB-I client may retry the request, but in doing so shall not retry the request at a rate faster than that defined by the back-off mechanism as described in clause 4.3.3.7. The DVB-I client may continue to retry until powered off and shall attempt to re-authenticate (if authentication is provided) before each retry.
In the case where the request was made to a ServiceList endpoint and more than one ServiceListURI is defined in a ServiceListOffering the DVB-I client shall attempt to make a connection to the next listed URI.

4.3.3.6 301 (Moved Permanently) or 302 (Moved Temporarily) Response followed by 4xx or 5xx Response

If a 301 (Moved Permanently) or 302 (Moved Temporarily) redirect subsequently results in a 40x or 50x HTTP response code on any request to any DVB-I endpoint listed in clause 4.1 the DVB-I client shall deem the request to have failed.

In the case where the request was made to a ServiceList endpoint and more than one ServiceListURI is defined in a ServiceListOffering the DVB-I client shall attempt to make a connection to the next listed URI.

4.3.3.7 Back-off algorithm

This clause describes the back-off algorithm to be used under situations covered in some of the preceding clauses when certain HTTP status code responses are received.

When the back-off mechanism is required, the DVB-I client shall wait for a random period before retrying the request, where the random period in milliseconds is between $\minwait$ and $\maxwait$ values given by:

\[
\minwait = 4^{CurrentRetry-1} \times 100 \text{ ms}
\]

\[
\maxwait = 4^{CurrentRetry} \times 100 \text{ ms}
\]

where:

- $CurrentRetry$ has the value 1 after the first failure and increments for each failed retry up to a maximum value of 10

This algorithm therefore waits up to 400ms before the first retry, up to 1 600 ms before the second, and so on. In all cases once the value of $CurrentRetry$ reaches 10 it shall not be incremented any further and the maximum retry period of 104 857 600 ms shall continue to be used for subsequent retries.

The retry count shall be reset when the device is powered off or restarted and does not need to be persisted.

4.4 Parental Access Control

The present document includes the following mechanisms by which a DVB-I client may obtain parental rating information for services and programmes within them.

- From Service.ParentalRating as defined in clause 5.5.28.
- From content guide metadata as defined in clause 6.10.15.
- For DASH delivered service instances;
  - From AdaptationSet.Rating,
  - From Content Programme Metadata carried in DASH MPD events as defined in clause 9.1.2.3 of ETSI TS 103 285 [1], or
  - From Content Programme Metadata carried in DASH inband events as defined in clause 9.1.2.3 of ETSI TS 103 285 [1]

Clause 5.5.28 defines precedence between Service.ParentalRating and content guide metadata.
4.5 Access Services

4.5.1 Introduction

This clause describes the metadata indication of access services provided by a content guide server or a DVB-I service, including linked applications.

Availability and corresponding properties of access services shall be signalled by child elements of the AccessibilityAttributes element as shown in the rightmost column of table 1a.

Table 1a: Access Services

<table>
<thead>
<tr>
<th>Access Service</th>
<th>Type of access service</th>
<th>Child element of AccessibilityAttributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-vision Sign Language</td>
<td>*</td>
<td>SigningAttributes</td>
</tr>
<tr>
<td>Subtitles</td>
<td>*</td>
<td>SubtitleAttributes</td>
</tr>
<tr>
<td>Audio Description</td>
<td>*</td>
<td>AudioDescriptionAttributes</td>
</tr>
<tr>
<td>Dialogue Enhancement</td>
<td>*</td>
<td>DialogueEnhancementAttributes</td>
</tr>
<tr>
<td>Spoken Subtitles</td>
<td>*</td>
<td>SpokenSubtitlesAttributes</td>
</tr>
<tr>
<td>Magnification UI</td>
<td>*</td>
<td>MagnificationUIAttributes</td>
</tr>
<tr>
<td>High Contrast UI</td>
<td>*</td>
<td>HighContrastUIAttributes</td>
</tr>
<tr>
<td>Screen Reader</td>
<td>*</td>
<td>ScreenReaderAttributes</td>
</tr>
<tr>
<td>Response to a User Action</td>
<td>*</td>
<td>ResponseToUserActionAttributes</td>
</tr>
</tbody>
</table>

The present document supports signalling for the access service types shown in the leftmost left column of table 1a. The two middle columns show if the accessibility feature is provided by the media or implemented on the user frontend of the linked application.

**NOTE:** The accessibility services marked as media features can also be provided by media presentation under control of a linked application.

The properties of each access service are signalled in the specific child-element (see right column) that may or may not be present in the AccessibilityAttributes element. Multiple versions of subtitle, for example, can cause multiple instances of the SubtitleAttributes element. If no child element for a particular service is present, the corresponding access service is not available in the context of the corresponding AccessibilityAttributes element.

The AccessibilityAttributes element can be placed at different locations shown in table 1b for indicating where the access services are available (see column four).
Table 1b: Location of the AccessibilityAttributes element indicating Access Service Availability

<table>
<thead>
<tr>
<th>Containing element</th>
<th>Location of containing element</th>
<th>Availability of access services</th>
<th>Allowed type of access service (table 1a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Guide</td>
<td>AVAttributes</td>
<td>InstanceDescription that is contained in ScheduleEvent or OnDemandProgram, not in BasicDescription</td>
<td>By the event media</td>
</tr>
<tr>
<td>Content Guide</td>
<td>RelatedMaterial</td>
<td>InstanceDescription</td>
<td>By the linked application from the event</td>
</tr>
<tr>
<td>Service List</td>
<td>ContentAttributes</td>
<td>ServiceInstance</td>
<td>By the service instance media</td>
</tr>
<tr>
<td>Service List</td>
<td>RelatedMaterial</td>
<td>ServiceInstance, Service (See note)</td>
<td>By the linked application from the service (instance)</td>
</tr>
</tbody>
</table>

NOTE: Properties of a linked application can be signalled on service level when the application is available for all service instances.

4.5.2 Access services provided by the media

4.5.2.1 Introduction

Access services can be available with the media provided in a Service List or an event on the content guide metadata (see table 1b).

NOTE: The accessibility services shown in clauses 4.5.2.2 to 4.5.2.6 can also be provided by media presented under control of a linked application.

The media can provide accessibility metadata, either included in the DVB-SI signalling according to ETSI EN 300 468 [6] or by a DVB-DASH Media Presentation Description (MPD) as specified in ETSI TS 103 285 [1]. DVB-I clients should show the user availability and attributes for access services as indicated by the signalling defined in the present document. The signalling of accessibility features described in clauses 4.5.2.2 to 4.5.2.6 should correspond to the metadata indicated by the DVB transport stream according to ETSI EN 300 468 [6] or the DASH MPD according to ETSI TS 103 285 [1].

4.5.2.2 In-Vision Sign Language

The availability of in-vision signed content shall be indicated by the presence of one or more AccessibilityAttributes.SigningAttributes elements.

The SigningAttributes.Coding element shall be set to the used video coding method as indicated by the corresponding termID value in the VideoCodecCS.

The SigningAttributes.SignLanguage element shall be set to sgn according to ISO 639-2 [17] or a sign language listed in ISO 639-3 [18].

Corresponding signalling can be found in clause 6.2.8 of ETSI EN 300 468 [6].

4.5.2.3 Subtitles

The availability of subtitles shall be indicated by the presence of one or more AccessibilityAttributes.SubtitleAttributes elements.

The SubtitleAttributes.Coding element shall be set to the used subtitles coding method as indicated by the corresponding termID value in the SubtitleCodingFormatCS specified in ETSI TS 102 822-3-1 [7]. If the subtitles conform to more than one payload format multiple elements should be used.
The `SubtitleAttributes.Carriage` element shall be set to the method used for carriage of the subtitles as indicated by the corresponding `termID` value in the `SubtitleCarriageCS` specified in ETSI TS 102 822-3-1 [7].

If the `Carriage` and/or `Coding` elements contains a classification scheme term that is not known by or is otherwise unsupported by the DVB-I client, subtitles shall be assumed to be unavailable.

When the `SubtitleAttributes.Carriage` element is set to “Application Subtitles” and/or the `SubtitleAttributes.Coding` element is set to “Application-defined Subtitle Format”, the `SubtitleAttributes.AppInformation` should be defined, as subtitle availability depends on whether the application is supported by the DVB-I client.

The `SubtitleAttributes.Purpose` element should be set to the purpose of the provided subtitles as indicated by the corresponding `termID` value in the `SubtitlePurposeCS` specified in ETSI TS 102 822-3-1 [7].

The `SubtitleAttributes.SubtitleLanguage` element should be set to the language code of the subtitle language according to ISO 639-2 [17].

Corresponding signalling can be found in clauses 6.2.8 and 6.2.41 or ETSI EN 300 468 [6], and clause 7 of ETSI TS 103 285 [1].

4.5.2.4 Audio Description

The availability of audio description shall be indicated by the presence of one or more `AccessibilityAttributes.AudioDescriptionAttributes` elements.

The `AudioAttributes.Coding` element contained in the `AudioDescriptionAttributes` element shall be set to the used audio coding method as indicated by the corresponding `termID` value in the `AudioCodecCS`.

The other elements contained in `AudioDescriptionAttributes.AudioAttributes` should indicate the properties of the audio stream providing the audio description service.

Corresponding signalling can be found in clauses 6.2.8, 6.2.41 and 6.4.1 and annex J of ETSI EN 300 468 [6], and clauses 6.1.2 and 6.7.5 of ETSI TS 103 285 [1].

4.5.2.5 Dialogue Enhancement

The availability of dialogue enhancement shall be indicated by the presence of one or more `AccessibilityAttributes.DialogueEnhancementAttributes` elements.

The `AudioAttributes.Coding` element contained in the `DialogueEnhancementAttributes` element shall be set to the used audio coding method as indicated by the corresponding `termID` value in the `AudioCodecCS`.

The other elements contained in `DialogueEnhancementAttributes.AudioAttributes` should indicate the properties of the audio stream providing the dialogue enhancement service.

Corresponding signalling can be found in clauses 6.2.8 and 6.4.1of ETSI EN 300 486 [6], and clause 6.1.2 and 6.7.5 of ETSI TS 103 285 [1].

4.5.2.6 Spoken Subtitles

The availability of spoken subtitles shall be indicated by the presence of one or more `AccessibilityAttributes.SpokenSubtitlesAttributes` elements.

The `AudioAttributes.Coding` element contained in the `SpokenSubtitlesAttributes` element shall be set to the used audio coding method as indicated by the corresponding `termID` value in the `AudioCodecCS`.

The other elements contained in `SpokenSubtitlesAttributes.AudioAttributes` should indicate the properties of the audio stream providing the spoken subtitles service.
Corresponding signalling can be found in clause 6.2.8 of ETSI EN 300 468 [6].

4.5.3 Access services implemented by a linked application

4.5.3.1 Introduction

Some of the accessibility features can only be implemented by a linked application (see table 1a). For example, a screen reader feature can provide a user interface to control the application. Clauses 4.5.2.2 to 4.5.2.6 show the signalling for features implemented by a linked application.

NOTE: The accessibility services shown in clauses 4.5.2.2 to 4.5.2.6 can also be provided by a media stream presented under control of a linked application.

In all these cases the corresponding AccessibilityAttributes are signalled in the RelatedMaterial element (see table 1b). An example is shown in clause 4.5.4.

ETSI TS 102 796 [21] specifies a framework for usage of accessibility features provided with a linked HbbTV application. Further details on how an HbbTV application can provide access services by either controlling playback of an accessible media stream, or by implementation of access services with the application can be found in clause 15.3 of ETSI TS 102 796 [21].

4.5.3.2 Application information signalling

Access services provided by a linked application may require a specified application run-time environment implemented with the DVB-I client, e.g., a specific version of ETSI TS 102 796 [21]. Additionally, this run-time environment may need to implement optional features which are required to correctly execute the application.

The AppInformation element within the RelatedMaterial element shall indicate the RequiredStandardVersion and the RequiredOptionalFeature by linking the elements to a corresponding URN, for example, from the list of available URNs in annex H.

4.5.3.3 Magnification UI

The MagnificationUIAttributes.Purpose element should be set to the corresponding purpose as indicated by the termID value of one of the Magnification UI Parameters in the AccessibilityPurposeCS specified in ETSI TS 102 822-3-1 [7].

More details for an HbbTV implementation of the Magnification UI feature can be found in clause 15.3.4 of ETSI TS 102 796 [21].

4.5.3.4 High Contrast UI

The HighContrastUIAttributes.Purpose element should be set to the corresponding purpose as indicated by the termID value of one of the High Contrast UI Parameters in the AccessibilityPurposeCS specified in ETSI TS 102 822-3-1 [7].

More details for an HbbTV implementation of the High Contrast UI feature can be found in clause 15.3.5 of ETSI TS 102 796 [21].

4.5.3.5 Screen Reader

The ScreenReaderAttributes.Purpose element should be set to the corresponding purpose as indicated by the termID value of one of the Screen Reader Parameters in the AccessibilityPurposeCS specified in ETSI TS 102 822-3-1 [7].

The ScreenReaderAttributes.ScreenReaderLanguage element should be set to the language a ScreenReader can read. If more than one language is supported the element is included multiple times.
More details for an HbbTV implementation of the Screen Reader UI feature can be found in clause 15.3.6 of ETSI TS 102 796 [21].

4.5.3.6 Response to a User Action

The ResponseToUserActionAttributes.Purpose element should be set to the corresponding purpose as indicated by the termID value of one of the Response to a User Action Parameters in the AccessibilityPurposeCS specified in ETSI TS 102 822-3-1 [7].

More details for an HbbTV implementation of the Response to a User Action feature can be found in clause 15.3.7 of ETSI TS 102 796 [21].

4.5.4 Examples

4.5.4.1 AccessibilityAttributes in a Service List

Figure 2a shows an example Service List for a linear service providing the following access services:

- DVB-S2 service instance
  - Audio Description in English
  - Subtitles in English and Spanish
- DVB-DASH service instance
  - Dialogue Enhancement for the English audio
  - Dialogue Enhancement for the Spanish audio
  - Subtitle in English, Spanish, Chinese, French and German
- Linked HbbTV application
  - Invision-Sign Language
  - High Contrast UI
  - Screen Reader with a female voice and consifurable playback speed

NOTE: Main Video and Audio in English and Spanish are signalled individually in the ContentAttributes and not listed above.

Figure 2a: Example for AccessibilityAttributes in a Service List

```xml
<Service version="1">
  <UniqueIdentifier>tag:dvb.org,2023:advsid1</UniqueIdentifier>
  <!-- DVB-S2 Service -->
  <ServiceInstance priority="1">
    <ContentAttributes>
      <AudioAttributes>
      </AudioAttributes>
      <AccessibilityAttributes>
        <tva:SubtitleAttributes>
          <tva:Coding href="urn:tva:metadata:cs:SubtitleCodingFormatCS:2023:2.1.3"/>
          <tva:SubtitleLanguage href="en"/>
          <tva:SuitableForTTS>False</tva:SuitableForTTS>
        </tva:SubtitleAttributes>
      </AccessibilityAttributes>
    </ServiceInstance>
  </Service>
</Service>
```
4.5.4.2 AccessibilityAttributes in the Content Guide Metadata

The example in figure 2b is derived from the example in figure 10 and for exemplary manner extended by signalling of a RelatedMaterial element for a linked application.

**Figure 2b: Example for AccessibilityAttributes in a ScheduleEvent**
5 Service Discovery

5.1 Concepts

5.1.1 Services

A DVB-I service is one which is discovered using the present document and which is available via one or more delivery mechanisms, called service instances, including DVB-DASH and traditional DVB broadcast. Such a DVB-I service:

- may be delivered over an IP network, either with or without ABR multicast, etc., or it may be replicated by DVB services delivered over existing DVB networks;
- may also be received by devices that do not have a DVB broadcast tuner, including mobile devices and others;
• may only be accessible under certain conditions (location, rating restrictions, conditional access, subscription, etc.);
• may be linear or on-demand;
• may include video, audio and subtitle components;
• may include access services;
• may have linked applications (similar to AIT in broadcast delivery);
• may be consumed on devices that have DVB tuners including DVB-T/S/C/IPTV as well as SAT>IP.

5.1.2 Service Lists

The DVB-I client accesses information about services through Service Lists.

Service Lists are published by Service List Providers. A Service List typically lists services from many content providers. The role of the Service List Provider is to curate and manage the Service List and provide service ordering and numbering information for ease of selection by users, particularly on television-like devices. It is also possible for a content provider to act as a Service List Provider themselves and publish a Service List containing only their own services.

A Service List Provider may target a Service List at a particular platform brand, geographical region, language or other market segment, or none of these.

The DVB-I client may choose and use Service Lists in many ways. For example:

• Clients marketed under a particular platform brand may make use of a single Service List for that platform.
• Clients may offer several Service Lists for the user to choose between, presenting the user with a view of services from only one Service List at any one time.
• Clients may make use of several Service Lists and combine them to provide the user with one set of services, with or without filtering options.

Each Service has a unique identifier that a client can use to determine if a service in one Service List is the same as a service in another. However, ordering and numbering information is only provided within the context of a specific Service List and any client wishing to combine Service Lists will need to consider how to order (and if appropriate, number) the combined list. How this is done is outside the scope of the present document.

A Service List shall be made available using HTTP according to clause 7.3 at a Service List URL, using the Media Type (MIME type) `application/vnd.dvb.dvbisl+xml`.

Some examples of how Service Lists may be used by the DVB-I client are provided in clause E.2.

5.1.3 Service List Discovery

5.1.3.1 Client options for Service List Discovery

A DVB-I client requires a means to find one or more Service Lists. This is referred to as Service List Discovery.

DVB-I supports three principal approaches to Service List Discovery:

• The client may have one or more built-in or privately provisioned Service List URLs for the specific Service List(s) that the client wishes to offer to the user.
• The client may make use of one or more Service List Registries.
• The client may obtain the Service List URL or the Service List from the CICAM.
In all cases, a Service List (or Service Lists) may be selected using knowledge of the user's geographical location or language preferences, or by offering the user a choice, or by the users CICAM.

A Service List Registry is an HTTP endpoint made available at a Service List Registry URL that can return a list of Service Lists and their Service List URLs.

Service List Registries may be operated by, or on behalf of, various kinds of organizations. Possible examples are:

- The manufacturer of a device which implements the DVB-I client and is serving only those devices.
- A national or regional regulator, providing information for the benefit of clients operating within the relevant nation or region.
- An operator or platform brand serving only their own clients.
- A Central Service List Registry (CSR), operated for the benefit of all devices implementing the DVB-I client, providing information on a wide set of Service Lists known to that registry.
- A third-party Service List aggregator.
- A CICAM operator serving only their own customers.

5.1.3.2 Service List Registry

A Service List Registry (SLR) is an HTTP endpoint available at a known URL that, if queried, can return a list of Service List Entry Points. A Service List Provider who wishes to enable the SLR discovery mechanism for their own Service Lists may register their Service List Entry Points in the SLR using the M interface in clause 4.1. The SLR also collects contact information of the Service List Providers. How the SLR collects and stores such information is out of scope of the present document.

The SLR shall be able to respond to queries issued by the DVB-I client.

All query parameters provided shall use the character set described in annex C of ETSI TS 102 809 [5]. Additionally, any "reserved" characters defined in clause 2.2 of IETF RFC 3986 [13] in the query string (within key/value pairs) shall be percent-encoded as defined in clause 2.1 of IETF RFC 3986 [13] before being submitted as a query parameter. A space may either be percent encoded (i.e. "%20"), or denoted as a plus sign, "+".

The maximum length of a fully qualified web service URL including parameters shall not exceed 2 048 characters. It shall not be necessary to construct URLs in excess of this length to access any of the Service Lists provided by an SLR.

Queries can be issued with or without query parameters. Query parameters may take advantage of the DVB-I client's knowledge of the user's geographical location or preferences. Where multiple values are accepted for a query parameter these shall be provided as repeated parameters with "square bracket" notation to indicate that they are array variables, the values shall be ordered alphabetically or in ascending numerical order. The square brackets "[" and "]" within the URL enable efficient parsing by a Service List Registry. The square brackets "[" and "]" shall be percent-encoded as defined in clause 2.1 of IETF RFC 3986 [13].

Multiple values for the same parameter shall be interpreted by the SLR using the OR logical operator, as alternatives. For example, if two TargetCountry parameter values are included in the query, for Country A and Country B, then service list offerings shall be included in the results that:

- specify Country A as their TargetCountry,
- specify Country B as their TargetCountry,
- specify Country A and Country B as their TargetCountry,
- do not specify a TargetCountry.
When a specific parameter is not included in the query, the SLR shall apply no filtering based on that parameter. Therefore, service list offerings that specify any value or no value for that parameter shall be included in the results. For example, if the parameter TargetCountry is not included in the query, service list offerings that specify any TargetCountry or have no TargetCountry elements shall be included in the results.

Query strings are included as part of the URL:

```
<ServiceListRegistryEndpoint>?<parameter1>=value1&<parameter2>=value2
```

Where `<ServiceListRegistryEndpoint>` contains only the scheme, authority and path syntax components of a URL as defined in clauses 3.1, 3.2 and 3.3 of IETF RFC 3986 [13].

The following query parameters can be used but shall be in the order presented (see clause 5.3 for description):

- TargetCountry
- regulatorListFlag
- Delivery
- Language
- Genre
- ProviderName
- inlineImages

When multiple parameters are provided, the values shall be ordered alphabetically or numerically increasing.

An HTTP 400 (Bad Request) response shall be returned:

- If an undefined query parameter is provided with a request to a Service List Registry endpoint, or
- If an invalid value is provided for a query parameter.

An HTTP 422 (Unprocessable Content) response shall be returned if the Service List Registry requires one of more query parameters but none were specified.

Examples of queries to a Service List Registry (see also clause C.4):

- `https://dvbisr.private-service-list-registry.com/query?TargetCountry[]=AUT &TargetCountry[]=DEU&Language=en` Query for all Service Lists targeted at Germany or Austria and in English language.
- `https://dvbisr.private-service-list-registry.com/query?ProviderName=TVfromTheWorld` Query for all Service Lists published by a Service List Provider named "TVfromTheWorld".

Query response shall be in the form of an XML document according to the schema defined in clause 5.3, including the list of Service List Entry Points matching the query parameters (carrying the URL of the associated Service Lists). When no service list offerings match with the SLR query parameters provided, the SLR query response shall not contain any ProviderOffering elements.
The &inlineImages parameter provides a boolean value to indicate whether or not the response should include graphical elements formatted according to IETF RFC 2397 [31]. If not provided, the Service List Registry shall assume a value of false and only HTTP URLs according to clause 7.3 to graphical elements will be provided in the response.

### 5.1.3.3 Announcement of a DVB-I service list in a broadcast channel

Broadcasters may signal the HTTP URL according to clause 7.3 of a Service List or a query to a Service List Registry in the DVB-SI metadata.

To this purpose, a URI linkage descriptor in the 1st loop of NIT or the 1st loop of BAT shall be used in accordance with the scoping rules defined in clause 6.5 of ETSI EN 300 468 [6], with uri_linkage_type = 0x03, as defined in ETSI TS 101 162 [11]. Where the uri_linkage_type = 0x03, the private_data_byte field of the URI linkage descriptor shall contain a DVB-I_info element according to table 1 to differentiate signalled URIs.

**Table 1: private_data_byte loop for URI linkage descriptor**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Number of bits</th>
<th>Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVB-I_info() {</td>
<td></td>
<td></td>
</tr>
<tr>
<td>end_point_type</td>
<td>8</td>
<td>uimsbf</td>
</tr>
<tr>
<td>if (end_point_type == 0x03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>service_list_name_length</td>
<td>8</td>
<td>uimsbf</td>
</tr>
<tr>
<td>for (i=0; i&lt;N; ++i) {</td>
<td></td>
<td></td>
</tr>
<tr>
<td>char</td>
<td>8</td>
<td>uimsbf</td>
</tr>
<tr>
<td>}</td>
<td>8</td>
<td>uimsbf</td>
</tr>
<tr>
<td>service_list_provider_name_length</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>for (i=0; i&lt;N; ++i) {</td>
<td></td>
<td></td>
</tr>
<tr>
<td>char</td>
<td>8</td>
<td>uimsbf</td>
</tr>
<tr>
<td>}</td>
<td>8</td>
<td>uimsbf</td>
</tr>
<tr>
<td>for (i=0; i&lt;N; ++i) {</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>private_data_byte</td>
<td>8</td>
<td>bslbf</td>
</tr>
<tr>
<td>}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: end_point_type values**

<table>
<thead>
<tr>
<th>end_point_type</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>Not used</td>
</tr>
<tr>
<td>0x01</td>
<td>The signalled URI refers to a DVB-I service list</td>
</tr>
<tr>
<td>0x02</td>
<td>The signalled URI contains a query to a Service List Registry</td>
</tr>
<tr>
<td>0x03</td>
<td>The signalled URI refers to a DVB-I service list including its corresponding name and provider name</td>
</tr>
<tr>
<td>0x04 - 0xff</td>
<td>Reserved for future use</td>
</tr>
</tbody>
</table>

When signalling end_point_type = 0x03, a valid service list name shall be provided. This is intended to facilitate client UI representation of the corresponding Service List when offering it to the user. If desired, a Service List Provider name may be omitted by setting the service_list_provider_name_length to 0.

A DVB-I client shall not spontaneously react to the appearance or change of such a linkage descriptor. It should only react if the user explicitly enters some kind of installation or setup mode. It should not prompt the user to enter such an installation or setup mode immediately when the appearance or change of such a linkage descriptor is detected, but include a delay in case of an error or an attack is in progress (see clause 7.2.1.5 for more information).

Where different Service Lists are signalled in different receivable networks and/or bouquets and the client has no mechanism to easily merge them or determine the most appropriate list then the client should install them all as separate lists or offer a mechanism to allow the user to choose which Service List of Service Lists to select.
5.1.3.4 Announcement of a Service List by a CICAM

A CICAM may signal the HTTP URL according to clause 7.3 of a Service List or a query to a Service List Registry.

For this purpose, a URI linkage descriptor in the 1st loop of the CICAM NIT shall be used as defined in clause 15 of ETSI TS 103 205 [32], with \texttt{uri\_linkage\_type} = 0x03 as defined in clause 5.9.3 of ETSI TS 101 162 [11], and with the \texttt{private\_data\_byte} field containing a \texttt{DVB-I\_info()} element as defined in clause 5.1.3.3.

5.1.3.5 Announcement of a Service List hosted by a CICAM

A CICAM may signal the URL of a Service List hosted by a CICAM auxiliary file system.

For this purpose, a URI linkage descriptor in the 1st loop of the CICAM NIT shall be used as defined in clause 15 of ETSI TS 103 205 [32], with \texttt{uri\_linkage\_type} = 0x03 as defined in clause 5.9.3 of ETSI TS 101 162 [11], and with the \texttt{private\_data\_byte} field containing a \texttt{DVB-I\_info()} element with \texttt{end\_point\_type} = 0x01, as defined in table 1 and table 2 in clause 5.1.3.3.

The URI scheme \texttt{"ci://"} shall be used for the URLs of Service List files hosted by a CICAM auxiliary file system.

A separate auxiliary file system shall be offered by the CICAM for hosting Service List files, as defined in clause 9 of ETSI TS 103 205 [32], using the DomainIdentifier "DVBIServiceDiscoveryProfile1".

Examples of valid URLs to Service List files hosted by a CICAM:

- \texttt{ci://ServiceListFile.xml}
- \texttt{ci://dvbi/AnotherServiceListFile.xml}
- \texttt{ci://DVBIServiceDiscoveryProfile1/subfolder/servicelist.xml}

5.1.3.6 Announcement of an updated Service List hosted by a CICAM

To notify the DVB-I client of an updated Service List hosted by the CICAM auxiliary file system, the CICAM shall advertise an incremented \texttt{nit\_version} in the \texttt{operator\_status()} APDU as defined in clause 15 of ETSI TS 103 205 [32], informing the DVB-I client of the updated CICAM NIT with an incremented \texttt{version\_number}, where the URI linkage descriptor in the 1st loop with \texttt{uri\_linkage\_type} = 0x03 references a Service List, with \texttt{end\_point\_type} = 0x01 in the \texttt{DVB-I\_info()} element, as defined in table 1 and table 2 in clause 5.1.3.3.

When a CICAM advertises a new version of the CICAM NIT, if the DVB-I client has already installed Services from a Service List hosted by the CICAM, the DVB-I client shall retrieve the latest version of the Service List in order to update the associated Services.

5.1.3.7 Announcement of an updated Service List HTTP URL by a CICAM

To notify the DVB-I client of a change to the Service List HTTP URL adhering to clause 7.3, the CICAM shall advertise an incremented \texttt{nit\_version} in the \texttt{operator\_status()} APDU as defined in clause 15 of ETSI TS 103 205 [32], informing the DVB-I client of the updated CICAM NIT with an incremented \texttt{version\_number}, where the URI linkage descriptor in the 1st loop with \texttt{uri\_linkage\_type} = 0x03 references a Service List, with \texttt{end\_point\_type} = 0x01 in the \texttt{DVB-I\_info()} element, as defined in table 1 and table 2 in clause 5.1.3.3.

When a CICAM advertises a new version of the CICAM NIT, if the DVB-I client has already installed Services from a Service List signalled by the CICAM, the DVB-I client shall update the HTTP URL according to clause 7.3 used to retrieve the Service List, and shall retrieve the latest version of the Service List in order to update the associated DVB-I services.

NOTE: This mechanism is not intended to be used for Service List updates, when there is no change to the Service List HTTP URL. See clauses 5.1.7 and 7.3.
5.1.3.8 Announcement of a Service List hosted by a broadcast carousel

Broadcasters or broadcast operators/platforms may signal the URL of a Service List carried in a broadcast carousel using a `dvb:` URL scheme in the URI linkage descriptor defined in clause 5.1.3.3. URLs referring to a Service List in a broadcast carousel are defined in clause 6.2 of ETSI TS 102 851 [16]. In addition to containing a Service List, the carousel may also contain icons for the services (see cause 5.2.6.2). These would be referenced from the Service List using relative filenames, i.e. a file named "a.png" in the same directory in the broadcast carousel as the Service List would be referenced from that service list as "a.png".

In the present document, the only broadcast carousel included is DSM-CC object carousel as defined in ISO/IEC 13818-6 [36], ETSI EN 301 192 [37], ETSI TS 102 809 [5] and as used by ETSI TS 102 796 [21].

**NOTE:** A user who had not connected their DVB-I client to an IP network would only have access to a Service List and not to a DVB-I content guide. As defined in clause 6.12, the DVB-I client would fall back to DVB-SI now/next information in the broadcast to the extent that is available.

A hybrid DVB-I client that has a process for detecting changes in the set of DVB-C/S/T broadcast multiplexes and services should check for updates in a broadcast DVB-I service list at the same time. Details of this are outside the scope of the present document.

**EXAMPLE:** A broadcast DVB receiver does a channel scan every night at a fixed time such as 2am. When a broadcast DVB-I service list signalled as defined in this clause is installed, a check for changes in the service list is made immediately after the end of the channel scan.

5.1.4 Relationships

Figure 3 summarizes the concepts of Service List Registry, Service List and Service.

```
<table>
<thead>
<tr>
<th>Service List Registry</th>
<th>Service List</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ ProviderName</td>
<td>+ Name</td>
<td>+ UniqueIdentifier</td>
</tr>
<tr>
<td>+ Language[]</td>
<td>+ ProviderName</td>
<td>+ ServiceName</td>
</tr>
<tr>
<td>+ Genre[]</td>
<td></td>
<td>+ ProviderName</td>
</tr>
<tr>
<td>+ TargetCountry[]</td>
<td>+ Name</td>
<td>+ ServiceInstance[]</td>
</tr>
<tr>
<td>+ Delivery[]</td>
<td></td>
<td>+ TargetRegion[]</td>
</tr>
<tr>
<td>+ regulatorListFlag</td>
<td></td>
<td>+ ContentGuideSource</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LCNTable</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ channelNumber</td>
</tr>
<tr>
<td>+ SubscriptionPackage[]</td>
</tr>
<tr>
<td>+ TargetRegion[]</td>
</tr>
</tbody>
</table>
```

**Figure 3: Relationships among Service List Entry Point, Service List, Service and LCN Table**

A single Service can be listed in many different Service Lists and may have a different channel number in each.

A Service List can include many different Services.

A Service List may be discoverable using a Service List Registry and may be listed in several registries. It is also possible to have Service Lists which are not advertised by any Service List Registry and which are used only by clients that already know the Service List URL.

A Service List Registry can advertise many Service Lists.

A Service shall only be defined once in a Service List but may be referenced multiple times with different logical channel numbers.
5.1.5 Subscription Packages

WARNING: The definition of subscription packages according to this specification may lead to overly large service list documents when used to offer subscription based channel lists, which can be somewhat mitigated using server side service list creation per region according to clause 5.6.4.4. The mechanism for describing the use of subscription packages in LCN tables is deprecated and likely to be replaced with alternative mechanisms in the future.

The optional element `SubscriptionPackage` contains a human readable label for a service provider defined subscription package, that applies to an LCN Table (see clause 5.5.12) or a service instance (see clause 5.5.4), and corresponds to the name of a package that a user can subscribe to. It can be used at different levels within the Service List to apply the desired policy of the Service List Provider. The service provider uses one or more `SubscriptionPackage` elements to denote a subscription that is required to be held by the viewer to successfully receive Services in a Service List or Service Instances in a Service. The `SubscriptionPackage` element can be used to present alternative Service Lists to the viewer depending on the subscription package or alternative Service Instances depending on the subscription package.

When `SubscriptionPackage` elements are used in a Service List, a `SubscriptionPackageList` element shall be defined (see clause 5.5.1 and 5.5.25), containing a list of all unique `SubscriptionPackage` elements present in the LCN tables and/or Service Instances within the Service List.

When `SubscriptionPackage` elements are used in combination with LCN tables, there shall be only one corresponding `LCNTable` for each unique `SubscriptionPackage` when no `TargetRegion` is used, or for each unique combination of `TargetRegion` and `SubscriptionPackage` when both `TargetRegion` and `SubscriptionPackage` are used.

The following cases are envisaged in DVB-I deployments:

- A Service List Provider may wish to signal a different service order as part of a subscription package of a viewer. In that case, different `SubscriptionPackage` elements in the respective different LCN Tables would allow the selection of the LCN Table corresponding to the subscribed package.

- A Service List Provider may wish to indicate that a service instance is part of a subscription package, e.g. for a better-quality representation of the programming. This could allow a DVB-I client to omit the use of the service instance not matching the subscription package.

- A Service List Provider may wish to indicate that an LCN Table is available on several subscription packages (e.g. "Movie Package", "Movie Plus Package"). In that case, several `SubscriptionPackage` elements may be included at the LCN Table level. The DVB-I client assumes that the same `LCNTable` is available for each of the listed subscription packages.

- A Service List Provider may wish to indicate that a Service Instance is available on several subscription packages (e.g. "Movie Package", "Movie Plus Package"). In that case, several `SubscriptionPackage` elements may be included at Service Instance level. The DVB-I client assumes that the same Service Instance is available for each of the listed subscription packages.

- To describe a Service Instance with several DRM system identifiers and subscription packages, several `ServiceInstance` elements shall be used with their respective `SubscriptionPackage` elements.

The method of selecting the applicable `SubscriptionPackage` may be user choice, or the client may determine the applicable package automatically (out of scope of the present document). For example, based on a feature of the DRM system, common interface or application environment.
5.1.6 Linked applications

Services in a Service List may have applications linked to them according to signalling defined in clause 5.2.3. Such linked applications may be used for a number of purposes including but not limited to the following:

- Adding value to linear television content in a similar way as "red button" applications add value to broadcast services. See "Application with media in parallel" in clause 5.2.3.2.

- Managing the presentation of a broadband-delivered service, for example in situations where the service requires technologies or features not found natively a DVB-I client. See "Application controlling media presentation".

- Performing tasks that need to be performed before presentation of some specific content can start. For example:
  - Obtaining a license from a DRM license server and passing it to a DRM system.
  - Presenting the viewer with terms and conditions relating to processing of private data and obtaining consent to such processing.

- Provide access to a service provider's home page, for example the entry page for a "catch-up" or "player".

- Providing access services to users as described in clause 4.5.3 via
  - playing media containing such accessibility features, or
  - a dedicated UI rendering within a linked application.

5.1.7 Service List Updates

A DVB-I client should check for an update of an installed Service List once every 24 hours. Cache-Control headers as defined in clause 4.3.2 may require more or less frequent updates.

Additionally, hybrid DVB-I clients should request an update of an installed Service List following an update of the associated broadcast signal(s) (e.g. an update to DVB-SI tables impacting service availability).

If updates are performed around a predetermined timeframe (e.g. 6am), a DVB-I client should randomise the exact update time, to spread out the impact on Service List Servers.

5.2 Procedures

5.2.1 Service Instance Matching

A hybrid DVB-I client may have one or more tuners for receiving DVB-T/C/S services, in addition to DVB-DASH services discovered using the present document. Such a hybrid DVB-I client may receive instances of the same DVB service via different DVB broadcast delivery systems. Each DVB service instance may differ in quality (e.g. video resolution, encoding), language or accessibility attributes, among other qualities.

A hybrid DVB-I client shall match instances of the same DVB service. For example, after successfully matching DVB service instances, a DVB-I client should present a single service list combining DVB-I and DVB-T/C/S services received without duplicates. When the user selects a service from such a combined service list, a hybrid DVB-I client may present the DVB service instance based on certain criteria, such as instance priority, the user's preferences or encoding quality.

To match service instances, a hybrid DVB-I client shall use the metadata it gathers during DVB-T/C/S installation, together with metadata present in Service Lists.
The primary aim is to prevent false matches. A hybrid DVB-I client shall only match a DVB-I service instance with a DVB-T/C/S service when the following conditions are fulfilled for a Service List:

- all mandatory Service List metadata elements listed in table 3 are present in Service List; and
- all metadata elements listed in table 3 that are present in the Service List match with metadata the client gathered during DVB-T/C/S installation.

Additionally, a hybrid DVB-I client should only match a Service Instance with a DVB-T/C/S service when the following conditions are fulfilled for a Service List:

- all metadata elements listed in table 4 that are present in the Service List match with metadata the client gathered during DVB-T/C/S installation.

To enable matching, a Service List Provider will need to include in a Service List, at least the metadata elements listed in table 3 that are needed to uniquely identify each DVB-T/C/S Service Instance.

### Table 3: Metadata required to be present in the Service List for matching Service Instances

| Service List metadata elements required for Service Instance matching | DVB Delivery System |
|---|---|---|
| DVB-S/S2 | DVB-T/T2 | DVB-C/C2 |
| Network ID | | |
| DVB Triplet (ONID, TSID, SID) (see note) | | |

**NOTE:** ONID and TSID are interpreted as wildcards when no value is specified in the metadata. However, either one or both of these attributes should be provided together with the SID to ensure the Service Instance can be matched reliably. Service Instance matching may not be valid if both TSID and ONID are omitted.

### Table 4: Additional metadata in the Service List for matching Service Instances

| Additional metadata elements | DVB Delivery System |
|---|---|---|
| DVB-S/S2 | DVB-T/T2 | DVB-C/C2 |
| Orbital Position | | |
| Frequency and Polarization (see note 1) | | |
| Service Name (see note 2) | | |
| Target Region (see note 3) | | |

**NOTE 1:** The frequency and polarization can only be used when it is possible to establish the correspondence between the Intermediate Frequency input from the LNB and the transmitted downlink frequency and polarization.

**NOTE 2:** The service name(s) to use for Service Instance matching are the ServiceName and, if provided, one or more ServiceInstance.AltServiceName elements.

**NOTE 3:** The Target Region is optional, as it may not be relevant for all Service Instances. When no Target Region is present, the other metadata elements will suffice to uniquely identify the Service Instance.

For DVB-S/S2 Service Instances, a device shall only use the frequency and polarization when it has established the correspondence between the Intermediate Frequency input from the LNB and the transmitted downlink frequency and polarization. In most installation cases, a device can establish this correspondence. For example, the correspondence can be established using satellite delivery system descriptors in the NIT together with the Intermediate Frequency, through detection or manual input of the LNB characteristics, or by using the Unicable [i.2] or Unicable 2 [i.3] standards. However, there may be cases (e.g. legacy single cable installations) where the device cannot establish that correspondence.

Different Service Instances may use variations of the same service name, such as "Channel 1", "Channel One", "Channel 1 HD" or "Ch 1 HD". Therefore, all relevant service name variants should be provided for each DVB-T/C/S
service instance in a Service List, using the ServiceName and one or more Service Instance AltServiceName elements.

It is recommended to only match a DVB-T/C/S service with a Service Instance when the DVB-T/C/S service name matches with the ServiceName element, or if provided, with one of the Service Instance AltServiceName elements, particularly when the Service Instance has a wildcard ONID or TSID.

Once a DVB-T/C/S service is matched with a Service Instance, a DVB-I client shall prioritise metadata defined in the matched Service and Service Instance over DVB-SI metadata. For example, a DVB-I client should prioritise the use of Service.ServiceInstance.DisplayName over the DVB-SI service_descriptor() service name in its UI, when a DisplayName is defined.

Example of metadata elements provided for a DVB-S2 service instance:

<table>
<thead>
<tr>
<th>DVB Delivery System</th>
<th>DVB-S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orbit Position</td>
<td>5.0 °W</td>
</tr>
<tr>
<td>Frequency and Polarization</td>
<td>11 054.50 MHz Vertical Polarization</td>
</tr>
<tr>
<td>DVB Triplet (ONID, TSID, SID)</td>
<td>0x20FA, 0x5014, 0x1019</td>
</tr>
<tr>
<td>Service Name</td>
<td>“France 3 Reims”</td>
</tr>
<tr>
<td>Alternative Service Name</td>
<td>“Fr3 Reims”</td>
</tr>
<tr>
<td>Target Region</td>
<td>(none)</td>
</tr>
</tbody>
</table>

Example of metadata elements provided for DVB-T service instances:

<table>
<thead>
<tr>
<th>DVB Delivery System</th>
<th>DVB-T</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVB Triplet (ONID, TSID, SID)</td>
<td>0x20FA, 0x0001, 0x0115; 0x20FA, 0x0001, 0x0144</td>
</tr>
<tr>
<td>Service Name</td>
<td>“France 3 Reims”</td>
</tr>
<tr>
<td>Alternative Service Name</td>
<td>“Fr3 Reims”</td>
</tr>
<tr>
<td>Target Region</td>
<td>(none)</td>
</tr>
</tbody>
</table>

5.2.2 Service Identifiers

Service identifiers shall use a registered URI scheme that allows independent allocation and ensures global uniqueness. Suitable URI schemes include the ”tag” URI scheme as defined in IETF RFC 4151 [3].

5.2.3 Signalling of Applications in the Service List

5.2.3.1 General

A RelatedMaterial element can be used to signal the location of an application associated with the service or service instance. The RelatedMaterial element shall contain the following two subelements:

- A MediaUri element whose value contains a URI for the application and whose @contentType attribute describes the type of application being referenced. The following values for @contentType are defined.
Table 7: MediaUri@contentType

<table>
<thead>
<tr>
<th>MediaUri@contentType</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>application/vnd.dvb.ait+xml</td>
<td>The MediaUri element carries the location of an XML AIT file which describes the application and its location. The semantics of the XML AIT file are defined in ETSI TS 102 809 [5].</td>
</tr>
<tr>
<td>text/html or application/xhtml+xml</td>
<td>The MediaUri element refers to an HTML5 webpage.</td>
</tr>
</tbody>
</table>

Multiple applications may be present with distinct MediaUri@contentType values. The DVB-I client may ignore any signalled application that has a MediaUri@contentType attribute that they do not understand.

There are two possible mechanisms for signalling arbitrary or different types of application.

- Application URIs with other MediaUri@contentType values than those in table 7 may be signalled as defined in the present document. The semantics of such URIs are not defined by the present document.
- Alternatively the XML AIT referenced above provides a means to signal applications of different types using the type element in the applicationDescriptor (see clauses 5.4.4.4, 5.4.4.11 and 5.2.2 of ETSI TS 102 809 [5]). The XML AIT format includes the possibility to signal multiple (alternative) instances of what is logically the same application, for example an HbbTV instance, a generic HTML5 instance targeted at a webview on a mobile phone, an Android application instance or an iOS application instance.

For a particular MediaUri@contentType, there shall be at most one RelatedMaterial element referencing an application with a HowRelated@href attribute set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:1.1 or urn:dvb:metadata:cs:LinkedApplicationCS:2019:1.2. These are for use when the service is active, i.e. during the specified availability period for the service instance (see clause 5.2.5).

There may optionally be a separate RelatedMaterial element at the service level referencing an application with a HowRelated@href attribute set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:2. This is for use when the service is not active (i.e. outside of the specified availability period, if included). Such an application shall be started in preference to the presentation of any still image signalled using a RelatedMaterial element with a HowRelated@href attribute set to urn:dvb:metadata:cs:HowRelatedCS:2021:1000.1 (see clause 5.2.5.3) where the application type is supported.

There may optionally be a separate RelatedMaterial element referencing an application with a HowRelated@href attribute set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:3. Linked applications with HowRelated@href set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:3 may have a name or icons associated with them if the MediaUri refers to an XML AIT file. The Application.appName element may be used to provide multi-lingual names. The IconDescriptor may be used to provide icons in multiple sizes and aspect ratios.

When a linked application is launched, the context in which the application was invoked may be passed to the application. For broadcast-independent HbbTV applications, this is defined in clause 6.2.6.2.6 of ETSI TS 102 796 [21].

- For linked applications where HowRelated@href is set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:1.2, the launch location "service" should be used.
- For linked applications where HowRelated@href is set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:2, the launch location "availability" should be used.
- Linked applications where HowRelated@href is set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:1.1 correspond to broadcast-related applications where the launch location is not used.
- For linked applications where HowRelated@href is set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:3, if the application is launched from a DVB-I...
content guide then "epg" shall be used, otherwise if the application is launched from a UI showing a list of DVB-I services (without guide data) then "channellist" shall be used, otherwise the most appropriate value of the "Defined launch location terms" from that clause shall be used.

NOTE: The location "channellist" is an intentional addition to the list in TS 102 796 [21].

The format of the applicationLocation and any service identifier used therein is at the discretion of the Content Provider, however, the Content Provider shall ensure that any included query parameters are distinct from the contextual parameters specified in clause 5.2.4.4.6. The URLBase and applicationLocation elements of the XML AIT may contain <! [CDATA[ ]] > encapsulated text, UTF-8 or HTML entity encoded characters as defined in clause 8.5 of W3C HTML 5.1 [29].

5.2.3.2 Applications and Media Presentation

Application with media in parallel

Where an application (with any MediaUri@contentType) is signalled using a RelatedMaterial element with a HowRelated@href attribute set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:1.1, the RelatedMaterial element provides initial application signalling for use when the service, or a specific service instance is selected and is available (as defined in clause 5.2.5). The process to present media shall begin in parallel with, and decoupled from, the application signalling being processed and any signalled application being started. Any application signalling delivered as part of the service itself (see clause 5.2.3.3) that the DVB-I client supports shall be processed whilst the service is active. When the application is signalled within a service instance, if media presentation fails and the client chooses to fall back to a lower priority service instance that also includes application signalling, the client shall process the application signalling of the lower priority service instance. The relationship between the initial signalling delivered in the RelatedMaterial element, any application signalling delivered as part of the service itself or as part of other service instances, and the lifecycle of the signalled application(s) is outside the scope of the present document.

Application controlling media presentation

Where an application (with any MediaUri@contentType) is signalled using a RelatedMaterial element with a HowRelated@href attribute set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:1.2, media presentation is to be managed by the linked application and no media stream shall be presented by the DVB-I client when the service is selected. A service instance containing one of these applications should not include any delivery parameters elements. If delivery parameters elements are included then they shall be ignored by the DVB-I client. The processing of any application signalling delivered as part of the service itself (see clause 5.2.3.3) is outside the scope of the present document.

5.2.3.3 Dynamic Application Signalling in Services

DVB-I metadata provides quasi-static application signalling. Certain service instance types can also carry dynamic application signalling. This clause describes those and their relationship with signalling carried in DVB-I metadata.

The DVB-I client that supports service instances delivered using MPEG-2 Transport Stream over DVB-C/S/T and supports an application type that can be signalled by means of a DVB AIT shall support both AITs referenced using a RelatedMaterial element and AITs delivered in MPEG section format (see clause 5.3 of ETSI TS 102 809 [5]). In the present document, the semantics of applications signalled using a RelatedMaterial element with a HowRelated@href attribute set to urn:dvb:metadata:cs:LinkedApplicationCS:2019:1.1 are not defined for broadcast service instances using DVBDeliveryParameters, DVBSDeliveryParameters or DVBCDeliveryParameters. Such elements should not be used. The DVB-I client shall ignore any application signalling using a RelatedMaterial element with this HowRelated@href attribute when selecting such a broadcast service instance and act solely on the broadcast AIT signalling.

NOTE: Co-existence between application signalling using a RelatedMaterial element as described in this clause and application signalling in a DVB-C, DVB-S or DVB-T service may be addressed in subsequent revisions of the present document or in the specification for a particular application technology.
The DVB-I client that supports service instances delivered using DVB-DASH and supports an application type that can be signalled by means of a DVB AIT shall support AITs referenced using a RelatedMaterial element and AITs referenced from a DVB-DASH EventStream (see clause 9.1.8 of ETSI TS 103 285 [1]).

When a DVB-DASH service instance is selected, application signalling using a RelatedMaterial element with a HowRelated@href attribute set to urn:dvb:imetadata:cs:LinkedApplicationCS:2019:1.1 (app with media in parallel) shall take effect until superseded by presentation of a DVB-DASH Period that contains an EventStream with schemeIdUri set to urn:dvb:dash:apps signalling:2016. Presentation of a DVB-DASH Period without such an EventStream shall have no effect on application signalling.

Linked applications may be notified by the DASH player of MPD events and in-band events as defined in clause 9.1.3 of ETSI TS 103 285 [1].

5.2.3.4 Application Signalling Precedence

Applications can be referenced at service or service instance level. A RelatedMaterial element within a ServiceInstance element referencing an application with a HowRelated@href attribute set to urn:dvb:imetadata:cs:LinkedApplicationCS:2019:1.1 or urn:dvb:imetadata:cs:LinkedApplicationCS:2019:1.2 overrides any RelatedMaterial element in the Service element that has either of those HowRelated@href values and has the same MediaUri@contentType. Similarly, a RelatedMaterial element in the ServiceInstance element with a HowRelated@href attribute set to urn:dvb:imetadata:cs:LinkedApplicationCS:2019:2 overrides any RelatedMaterial element in the Service element with that HowRelated@href value and has the same MediaUri@contentType value.

RelatedMaterial elements with a HowRelated@href attribute set to urn:dvb:imetadata:cs:LinkedApplicationCS:2019:3 shall not be used in the ServiceInstance element, only in the Service element.

5.2.3.5 Example

An example of an XML AIT for a linked application is shown in figure 4.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<mhp:ServiceDiscovery xmlns:mhp="urn:dvb:mhp:2009"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <mhp:ApplicationDiscovery DomainName="channel7.com">
    <mhp:ApplicationList>
      <mhp:Application>
        <mhp:appName Language="eng">Channel7 Player</mhp:appName>
        <mhp:applicationIdentifier>
          <mhp:orgId>123</mhp:orgId>
          <mhp:appId>0</mhp:appId>
        </mhp:applicationIdentifier>
        <mhp:applicationDescriptor>
          <mhp:type>
            <mhp:OtherApp>application/vnd.hbbtv.xhtml+xml</mhp:OtherApp>
          </mhp:type>
          <mhp:controlCode>AUTOSTART</mhp:controlCode>
          <mhp:visibility>VISIBLE_ALL</mhp:visibility>
          <mhp:serviceBound>false</mhp:serviceBound>
          <mhp:priority>0</mhp:priority>
          <mhp:version>01</mhp:version>
          <mhp:mhpVersion>
            <mhp:profile>0</mhp:profile>
            <mhp:versionMajor>1</mhp:versionMajor>
            <mhp:versionMinor>3</mhp:versionMinor>
            <mhp:versionMicro>1</mhp:versionMicro>
          </mhp:mhpVersion>
        </mhp:applicationDescriptor>
      </mhp:Application>
    </mhp:ApplicationList>
  </mhp:ApplicationDiscovery>
</mhp:ServiceDiscovery>
```
5.2.4 Signalling of Applications in the Content Guide

5.2.4.1 General

Signalling within the content guide metadata provides deep links to applications which control presentation of the content (on-demand and live streams). A DVB-I client shall determine both content availability and its capability of playing the content before an item of content is indicated as available to the user.

While the metadata described in clause 6 can be used by the DVB-I client to determine the availability of content, the AIT mechanism described in clause 5.2.4.4 is used to determine whether a device has the capability to play the content. In order to make this process efficient for the DVB-I client, a Template XML AIT is used which describes the attributes of an application (e.g. minimum HbbTV version) without providing the content specific or service specific deep link.

Applications in the Content Guide can be used to provide access services to users via playing streams containing such accessibility features or via dedicated UI rendering within the linked application. See clause 4.5.3 for access services provided by linked applications.

There are three XML AIT types that require different processing by a DVB-I client. These are:

- **Linked application XML AIT** - For applications in the service list which are signalled with MediaUri@contentType="application/vnd.dvb.ait+xml" according to clause 5.2.3.

- **Content deep-linked XML AIT** - For On Demand programmes, this is linked to via the ProgramURL element in an OnDemandProgram element of the content guide as described in clause 6.10.8. For Restart, this is linked to via the MediaUri element within a RelatedMaterial element in a ScheduleEvent element as described in clause 6.5.5. Context deep-linked XML AITs are described in greater detail in clause 5.2.4.3.

- **Template XML AIT** - For On Demand programmes, this is linked to via the AuxiliaryURL element in an OnDemandProgram element as described in clause 6.10.8. For Box Set Lists, this is linked to via the AuxiliaryURI element in a RelatedMaterial element in a GroupInformation element as described in clause 5.2.4.4. For Restart, this is linked to via the AuxiliaryURI element in a MediaLocator element in a ScheduleEvent element as described in clause 6.5.5. Template XML AITs are described in greater detail in clause 5.2.4.4.

XML AIT files shall be delivered by Content Providers with the Content-Type header set to application/vnd.dvb.ait+xml.

XML AIT files shall also signal one of the following MIME type values to represent each application type within the mhp:ApplicationDescription.mhp:type.mhp:OtherApp element

- application/vnd.hbbtv.xhtml+xml for an HbbTV application as defined in clause 7.2.3.2 of ETSI TS 102 796 [21].

- text/html or application/xhtml+xml for an HTML5 webpage.
The format of the applicationLocation and any service identifier used therein is at the discretion of the Content Provider, however, the Content Provider shall ensure that any included query parameters are distinct from the contextual parameters specified in clause 5.2.4.4.6. The URLBase and applicationLocation elements of the XML AIT may contain &lt;![CDATA[]]&gt; encapsulated text, UTF-8 or HTML entity encoded characters as defined in clause 8.5 of W3C HTML 5.1 [29].

XML AIT files shall be served using HTTP according to clause 7.3.

NOTE: The use of the Template XML AIT mechanism allows a single cacheable document to be used to indicate the capability required to play a range of content. This means that in order to indicate availability (including capability) of on-demand content and services across a whole EPG/Content Guide the DVB-I client is not required to download and process an individual AIT for each individual item of content. Only when the user chooses to playback an on-demand asset does the DVB-I client fetch and process the content deep-linked AIT. This is illustrated in figure 5.

The "context" addition to the AIT request URL is described in clause 5.2.4.4.6.

Figure 5: Template XML AIT and Content Deep-link XML AIT process

5.2.4.2 Application Priority

There may be multiple applications listed in an XML AIT. When determining which to launch the client shall process each application in turn and select the application with the highest mhp:priority value that meets all of the following criteria:

- **Application type equals** application/vnd.hbbtv.xhtml+xml or text/html or application/xhtml+xml - This shall be specified in the mhp:ApplicationDescription.mhp:type.mhp:OtherApp element. This is a MIME type defined in clause 7.2.3.2 of ETSI TS 102 796 [21]. The client shall ignore applications listed with values other than application/vnd.hbbtv.xhtml+xml or text/html or application/xhtml+xml.

- **Platform profile** - The platform profile value shall be specified in the child elements of the mhp:mhpVersion element. This shall be as defined in clause 7.2.3.1, table 5 of ETSI TS 102 796 [21]. The client shall launch applications signalled with values of version.major, version.minor, and version.micro according to table 5 of ETSI TS 102 796 [21]. The client shall ignore applications listed with other values.
Where an AIT is supplied for which the client is unable to determine an executable application then the client shall not issue an error to the user but instead shall show a service or content item as unavailable.

There may be cases where content is signalled as available in the OnDemandProgram element, but the content provider is unable to provide a suitable application based on device specific information (i.e. contextual parameters described in clause 5.2.4.4.6, or based on user-agent information), for example, regionally restricted content. In these situations, an XML AIT shall be returned where the mhp:ApplicationDescriptor.mhp:type.mhp:OtherApp shall be set to application/vnd.dvbi.non.

5.2.4.3 On Demand deep-linked XML AIT

The purpose of the On Demand deep-linked XML AIT is to provide a mechanism to launch directly to a specific piece of content within a Content Provider's player application. Within the XML AIT the concatenation of URLBase and applicationLocation shall form a URL specifying an application launch location that allows launching of a player application directly. The format of the applicationLocation and any content identifier used therein is at the discretion of the Content Provider, however, the Content Provider shall ensure that any included query parameters are distinct from the contextual parameters specified in clause 5.2.4.4.6. Both URLBase and applicationLocation may contain <![CDATA[[]]> encapsulated text, UTF-8 or HTML entity encoded characters as defined in clause 8.5 of W3C HTML 5.1 [29]. Client devices shall be able to decode/extract this text to establish the complete URL.

The client device shall append any specified contextual parameters to the XML AIT URL prior to calling it; see clause 5.2.4.4.6 for further details on these parameters.

For On Demand programmes, the content deep-linked XML AIT shall be referenced in the OnDemandProgram.ProgramURL element of responses. For Restart, the content deep-linked XML shall be referenced in a Schedule response filtered by Now/Next using a HowRelated element with an @href attribute carrying the value urn:fvc:metadata:cs:HowRelatedCS:2018:restart within a Schedule.ScheduleEvent.InstanceDescription element.

If the content deep-linked XML AIT is unavailable the client device shall consider the content to be unavailable and behave gracefully.

Multiple mhp:Application elements may exist within the mhp:ApplicationList. All applications in the AIT shall have the same mhp:orgId and mhp:appId. Where multiple mhp:Application elements are present the client device shall use the application with the highest mhp:priority value in the list that meets the device criteria it can support (see clause 5.2.4.2).
5.2.4.4 Template XML AIT

5.2.4.4.1 Introduction

The purpose of the template XML AIT is to allow a client device to determine if it has a compatible environment to play the associated content, allowing a generic way to determine support for all content from which it is referenced, and thus requiring the download and processing of just one XML AIT for all the referenced content items.

Client devices shall perform a textual comparison of the Template XML AIT URL against the Template XML AIT URL of AITs that have already been processed. Equivalence shall negate the need to fetch and process the Template XML AIT again.

Template XML AITs are provided for On Demand programmes, Restart streams and Box Sets. They are signalled in different ways, as defined below, but the behaviour is the same.

A single Template XML AIT may be referenced for all OnDemandProgram entities, Restart streams and/or Box Sets from a given Content Provider that require the same environment.

This allows a Content Provider to reference the same Template XML AIT from all content requiring the same environment (e.g. HbbTV/HTML), which in turn means that the client device only needs to analyse a single XML AIT for those OnDemandProgram elements, Restart streams and Box Sets before determining whether it is capable of displaying the content, and therefore whether to show the content as available. Content compatibility shall be determined by following the guidelines as defined in clause 5.2.4.2.

In the case that the client device does not have a compatible environment for the content, the content shall be marked as unavailable.

Multiple mhp:Application elements may exist within the mhp:ApplicationList. All applications in the AIT shall have the same mhp:orgId and mhp:appId. Where multiple mhp:Application elements are present the client device shall assume it can run the application if any of the applications listed meet the compatibility criteria above.

The client device shall append any specified contextual parameters to the XML AIT URL prior to calling it; see clause 5.2.4.4.6 for further details on these parameters.

5.2.4.4.2 On Demand Programmes

Within every OnDemandProgram element supplied through the content guide interface there shall be an AuxiliaryURL referencing a Template XML AIT. This XML AIT is identical to the content deep-linked XML AIT (provided via the ProgramURL element) except that the content specific identifiers have been removed. The mhp:applicationLocation element shall be ignored.

This format of XML AIT shall be referenced in the OnDemandProgram.AuxiliaryURL element of responses from the Schedule endpoint calls.
5.2.4.4.3 Restart

Alongside every Restart XML AIT supplied through the content guide interface there shall be a Template XML AIT. This is found in RelatedMaterial element with a HowRelated element with an @href attribute carrying the value urn:fvc:metadata:cs:HowRelatedCS:2018:restart within a Schedule.ScheduleEvent.InstanceDescription element.

5.2.4.4.4 Box Sets

Every Box Set in a Box Set List response shall have an associated Template XML AIT. This represents the Template AIT (i.e. required capability) for every content item in the Box Set. This is found in the GroupInformation fragment describing the Box Set, in a RelatedMaterial element with a HowRelated element with an @href attribute carrying the value urn:fvc:metadata:cs:HowRelatedCS:2018:templateAIT, for example:

```xml
<RelatedMaterial>
  <MediaLocator>
    <MediaUri/>
    <AuxiliaryURI contentType="application/vnd.dvb.ait+xml">
      https://www.live.mybroadcastertvapps.co.uk/tap/iplayer/ait/launch/iplayer.aitx
    </AuxiliaryURI>
  </MediaLocator>
</RelatedMaterial>
```

5.2.4.4.5 Template XML AIT Refreshing

The client device shall respect the Expires header and/or Cache-Control: max-age header when retrieving Template XML AIT documents, refreshing any cached Template XML AITs at the next opportunity once the timestamp/duration is reached. If no Expires or max-age header is provided the client device shall assume an expiry of 24 hours from retrieval. If both an Expires and max-age header are present the client device shall use the Cache-Control: max-age to determine when to refresh the Template XML AIT.

If the Template XML AIT is unavailable and the client device has a cached version from an earlier request it shall continue to use the cached version, until it is available through the retry mechanisms described in clause 4.3.3. If no cached version is available, then all content referencing the Template XML AIT shall be considered unavailable until it is available through the retry mechanisms described in clause 4.3.3.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<mhp:ServiceDiscovery xmlns:mhp="urn:dvb:mhp:2009"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <mhp:ApplicationDiscovery DomainName="channel7.com">
    <mhp:ApplicationList>
      <mhp:Application>
        <mhp:appName Language="eng">Channel7 Player</mhp:appName>
        <mhp:applicationIdentifier>
          <mhp:orgId>123</mhp:orgId>
          <mhp:appId>0</mhp:appId>
        </mhp:applicationIdentifier>
        <mhp:applicationDescriptor>
          <mhp:type>
            <mhp:OtherApp>application/vnd.hbbtv.xhtml+xml</mhp:OtherApp>
          </mhp:type>
          <mhp:controlCode>AUTOSTART</mhp:controlCode>
          <mhp:visibility>VISIBLE_ALL</mhp:visibility>
          <mhp:serviceBound>false</mhp:serviceBound>
          <mhp:priority>8</mhp:priority>
        </mhp:applicationDescriptor>
      </mhp:Application>
    </mhp:ApplicationList>
  </mhp:ApplicationDiscovery>
</mhp:ServiceDiscovery>
```
5.2.4.4.6 Contextual Parameters

In order to allow applications to behave in a contextual and regionally aware manner, additional parameters are required to be passed in the URL when retrieving any Template XML AIT, OnDemand Deep-linked XML AIT or Service Deep-linked XML AIT. Client devices shall append all of the following parameters to the XML AIT URL provided in the metadata before attempting to retrieve the document:

- All regionID values specific to the device.
- The UI location from which the application is being launched.

These contextual parameters shall be appended to the URL using either a "?" or a "&" character in order to maintain a legal URL structure as defined in IETF RFC 3986 [13]. For instance, assuming that the AIT_URL already includes at least one query parameter the format shall be:

```
&amp;regionID[]=region_id_1&amp;regionID[]=region_id_2...&amp;lloc=launch_location
```

If no query parameter is already present in the AIT_URL then the format shall be:

```
?regionID[]=region_id_1&amp;regionID[]=region_id_2...&amp;lloc=launch_location
```

where:

- region_id_x: may be a single regionID as determined by the client device (see clause 5.6.2)
- launch_location: shall be as defined in clause 6.2.2.6.2 of ETSI TS 102 796 [21]

Example URL:

```
https://channel7.co.uk/ait.aitx?pid=b01myjsy&amp;regionID[]=Piemonte&amp;lloc=epg
```

5.2.5 Signalling of Part Time Services

5.2.5.1 General

Services are anticipated to operate all day, every day, however there are likely to be some exceptions to this, for example live services that may only be present during an actual event or regional services that supersede national services. A service, or a replacement for a service, can be specified as being only available for certain times of the day, certain days of the week, for certain periods of time or a combination of any of these factors. For such services, the
hours and/or days that the service are available are expressed though the Availability element within the service instance and are referred to as the Scheduled Service Hours.

### 5.2.5.2 Scheduled Service Hours

For service instances that are not always available, an Availability element shall be added into the service instance to denote the hours of days, days of week and weekly cadence that the service instance is available. A description of the Availability element is given in clause 5.5.15.

Any number of Period elements can be specified to describe the overall availability of the service instance, for example:

A service instance that is only on air in July 2019 and September 2019

```xml
<Availability>
  <Period validFrom="2019-07-01T00:00:00Z" validTo="2019-07-31T23:59:59Z"/>
  <Period validFrom="2019-09-01T00:00:00Z" validTo="2019-09-30T23:59:59Z"/>
</Availability>
```

Within each Period element, multiple Interval elements can be specified, each covering a single block of time, denoted by the @startTime and endTime attributes on one or more days of the week. Times are expressed in UTC as indicated by "Z" (see clause 3.2.8.2 of W3C XML Schema Part 2: Datatypes [i.6] for additional syntax). For example:

A service instance that is only available on Mondays and Wednesdays between 5pm and 5:30pm Central European Time

```xml
<Availability>
  <Period>
    <Interval startTime="16:00:00Z" endTime="16:30:00Z" days="1 3"/>
  </Period>
</Availability>
```

The Interval element can optionally contain a @recurrence attribute that represents the weekly cadence. The cadence starts in the week indicated by the @validFrom attribute, the Interval element shall be ignored if @recurrence is specified but no @validFrom is specified in the containing Period element.

The intervals specified in the Period elements define a timeline describing when the service instance can be selected or used. The union of these intervals cumulatively define the availability of the service instance.

### 5.2.5.3 Service selection outside Scheduled Service Hours

If the DVB-I client selects a part time service at a time that is outside of the scheduled hours for all service instances or when all service instances of a currently selected service become unavailable, several options are possible:

- The application signalled for the service (refer to clause 5.2.3) can be started. This option should be used if the application type is supported by the DVB-I client.
- An out of service image that is specified in the RelatedMaterial for the service can be presented.
- Some implementation specific behaviour can be invoked.

An out of service image is signalled in a single RelatedMaterial element with the following:

- A HowRelated element with an @href attribute carrying the value urn:dvb:metadata:cs:HowRelatedCS:2021:1000.1. This classification scheme is defined in clause D.1.
- MediaLocator elements which include a MediaUri element whose value contains a URI to the image file and whose @contentType attribute carries the image Media Type (MIME type).
Multiple out of service images can be signalled where each has a `MediaLocator` element in the `RelatedMaterial` element and the natural language of any text contained in the image should be reflected in the `@contentLanguage` attribute such that the DVB-I client can present the most useful image. Other image formats can also be provided. The DVB-I client can request the image be scaled to a different resolution or appearance prior to delivery according to the method defined in clause 5.2.8.2.

5.2.6 Graphical Elements

5.2.6.1 Service List Logos

Logos for the service list shall be signalled in a single `RelatedMaterial` element within the service list with the following:

- `MediaLocator` elements which include a `MediaUri` element whose value contains a URI to the image file and whose `@contentType` attribute carries the image Media Type (MIME type).

Multiple service list logos can be signalled where each has a `MediaLocator` element in the `RelatedMaterial` element. At least one service list logo shall be provided with the Media Type image/jpeg or image/png for compatibility purposes and other image formats including image/webp may be optionally provided. The DVB-I client can request the image be scaled to a different resolution or appearance prior to delivery according to the method defined in clause 5.2.8.2.

5.2.6.2 Service Logos

Logos for the service shall be signalled in a single `RelatedMaterial` element within the service with the following:

- A `HowRelated` element with an `@href` attribute carrying the value `urn:dvb:metadata:cs:HowRelatedCS:2021:1001.2`. This classification scheme is defined in clause D.1.
- `MediaLocator` elements which include either
  - a `MediaUri` element whose value contains a URI to the image file and whose `@contentType` attribute carries the image Media Type (MIME type), or
  - a `MediaUri` element whose value contains an encoding of the service logo according to IETF RFC 2397 [31] and whose `@contentType` attribute carries the image Media Type (MIME type).

Conveying encoded images can result in very large XML documents. It is recommended that a dereferenceable URL be provided to ensure maximum compatibility. When an IETF RFC 2397 [31] data URL is used to convey the logo, the media type in the URI shall always be specified and shall match the value of the `@contentType` attribute.

Multiple service logos can be signalled where each has a `MediaLocator` element in the `RelatedMaterial` element. At least one service logo shall be provided with the Media Type image/jpeg or image/png for compatibility purposes and other image formats including image/webp may be optionally provided. Service logos can be signalled at the service and service instance levels. The DVB-I client can request the image be scaled to a different resolution or appearance prior to delivery according to the method defined in clause 5.2.8.2.
5.2.6.3 Content Guide Source Logos

Logos for the content guide source shall be signalled in a single RelatedMaterial element within the service list with the following:

- A HowRelated element with an @href attribute carrying the value

- MediaLocator elements which include a MediaUri element whose value contains a URI to the image file
  and whose @contentType attribute carries the image Media Type (MIME type).

Multiple content guide source logos can be signalled where each has a MediaLocator element in the RelatedMaterial element. At least one content guide source logo shall be provided with the Media Type image/jpeg or image/png for compatibility purposes and other image formats including image/webp may be optionally provided. The DVB-I client can request the image be scaled to a different resolution or appearance prior to delivery according to the method defined in clause 5.2.8.2.

5.2.6.4 Service Banners

Banners for the service shall be signalled in a single RelatedMaterial element within the service list with the following:

- A HowRelated element with an @href attribute carrying the value

- MediaLocator elements which include a MediaUri element whose value contains a URI to the image file
  and whose @contentType attribute carries the image Media Type (MIME type).

A service banner is intended to be interchangeable and complementary with the logo and could be used where more screen space is available to depict a scene or theme for the service is available. A service banner can also be used in conjunction with the service logo. Multiple service banners can be signalled where each has a MediaLocator element in the RelatedMaterial element. At least one service banner shall be provided with the Media Type image/jpeg or image/png for compatibility purposes and other image formats including image/webp may be optionally provided. Service banners can be signalled at the service level. The DVB-I client can request the image be scaled to a different resolution or appearance prior to delivery according to the method defined in clause 5.2.8.2.

5.2.7 Description of DVB-I linear services and playlists

5.2.7.1 General

A DASH service instance can be either a linear service, i.e. a broadcast of scheduled programmes not streamed to a specific user, or a sequence of VoD streams, i.e. a playlist.

A playlist can be static, i.e. the same sequence of audio/video assets is provided to all users, or dynamic/personalized, i.e. the sequence of audio/video assets is dynamically created by the playlist server (see figure 1) when requested. The playlist is signalled to the DVB-I client as a DASH service instance with a content type that differentiates it from a regular DVB-DASH manifest file. The DVB-DASH manifest or playlist should only be retrieved and processed when the service instance is selected.

Personalization may be enabled with the assistance of a service related application and/or using cookies (out of scope).
5.2.7.2 DVB-I client behaviour

The DVB-I client can discriminate among the above options by means of the `@contentType` attribute of `UriBasedLocation`:

- If `@contentType` attribute carries `application/dash+xml`, the URL refers to an MPD file, describing either a DVB-I linear service or a playlist generated server side transparently for the DVB-I client.
- If `@contentType` attribute carries `application/xml`, the URL refers to an XML file provided by a playlist server, which in turn describes a dynamic/personalized playlist (see example in clause 5.2.7.4).

5.2.7.3 Handling and end of playlist or VoD content

When the DVB-I client has played out the VoD MPD or all of the items in the playlist, it should present a Content Finished image if one is signalled.

A content finished image is signalled in a single `RelatedMaterial` element with the following:

- A `HowRelated` element with an `@href` attribute carrying the value `urn:dvb:metadata:cs:HowRelatedCS:2021:1000.2`. This classification scheme is defined in clause D.1.
- `MediaLocator` elements which include a `MediaUri` element whose value contains a URI to the image file and whose `@contentType` attribute carries the image Media Type (MIME type).

Multiple content finished images can be signalled where each has a `MediaLocator` element in the `RelatedMaterial` element and the natural language of any text contained in the image should be reflected in the `@contentLanguage` attribute such that the DVB-I client can present the most useful image. At least one content finished image shall be provided with the Media Type image/jpeg or image/png for compatibility purposes and other image formats including image/webp may be optionally provided. The DVB-I client can request the image be scaled to a different resolution or appearance prior to delivery according to the method defined in clause 5.2.8.2.

5.2.7.4 Examples

a) Description of a DVB-I linear service:

```xml
<ServiceInstance>
  <DisplayName>Linear Service 24/7</DisplayName>
  <DASHDeliveryParameters>
    <UriBasedLocation contentType="application/dash+xml">
      <URI>
        https://www.broadcaster.com/mpd/linear_service_24x7.mpd
      </URI>
    </UriBasedLocation>
  </DASHDeliveryParameters>
</ServiceInstance>
```

b) Description of a dynamic/personalised playlist:

```xml
<ServiceInstance>
  <DisplayName>Dynamic/Personalised Playlist</DisplayName>
  <DASHDeliveryParameters>
    <UriBasedLocation contentType="application/xml">
      <URI>
        http://www.playlist_provider.com/playlists/MyPlaylist.xml
      </URI>
    </UriBasedLocation>
  </DASHDeliveryParameters>
</ServiceInstance>
```
where the MyPlaylist.xml file contains:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<Playlist xmlns="urn:dvb:metadata:servicediscovery:2024"
xsi:schemaLocation="urn:dvb:metadata:servicediscovery:2024 ../dvbi_v6.0.xsd" >
  <PlaylistEntry>https://www.broadcaster.com/mpd/my_first_clip.mpd</PlaylistEntry>
  <PlaylistEntry>https://www.broadcaster.com/mpd/my_second_clip.mpd</PlaylistEntry>
  <PlaylistEntry>https://www.broadcaster.com/mpd/my_third_clip.mpd</PlaylistEntry>
</Playlist>
```

c) Description of a static or dynamic playlist generated server-side (i.e. the service provider server takes care of preparing a specific multi-period MPD, transparently for the DVB-I client):

```xml
<ServiceInstance>
  <DisplayName>Playlist generated server-side</DisplayName>
  <DASHDeliveryParameters>
    <UriBasedLocation contentType="application/dash+xml">
      <URI>
        https://www.broadcaster.com/mpd/first+second+third_clip.mpd
      </URI>
    </UriBasedLocation>
  </DASHDeliveryParameters>
</ServiceInstance>
```

### 5.2.8 Images

#### 5.2.8.1 Introduction

Provides an image linked from the service list or content guide sourced metadata and scaled according to the provided width parameter in pixels.

Service Lists, services, applications, and programmes may have an associated image, referenced in the `ServiceList` element, `GroupInformation` fragment or `ProgramInformation` fragment within a `RelatedMaterial` element.

**NOTE:** Client UI designs vary, for example some clients may have monochrome colour scheme; others may have a richly coloured scheme. The layout of client UI means that a particular image (e.g. service logo) may be required in different shapes and sizes. In order to get the best visual experience, it is preferred that shape and scheme are controlled at the source as part of the editorial process. With regard to size, it is usual that server-side scaling produces better image appearance.

The image variant query mechanisms allow a client to specify the most appropriate shape and colour scheme for its UI. This allows for streamlined metadata only containing the most appropriately formatted image. When requesting an image, the horizontal size of the image may be specified to allow the server to scale on behalf of the client.

#### 5.2.8.2 Image Processing Requests

##### 5.2.8.2.1 Image Variants

A range of variants may be available for certain image categories as defined below. The DVB-I client may append an optional `image_variant` query parameter to requests to certain endpoints to request a particular variant.

Only the requested variant, if available for an item, shall be returned by a Service List Server or Content Guide Server. If the requested variant is unavailable for an item, then the response shall not contain any image for that item.

Table 8 shows permissible `image_variant` query parameters.
Table 8: Image variants

<table>
<thead>
<tr>
<th>Image variant</th>
<th>Query parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:9 colour</td>
<td>16x9_colour</td>
</tr>
<tr>
<td>1:1 colour</td>
<td>square_colour</td>
</tr>
<tr>
<td>4:3 colour</td>
<td>4x3_colour</td>
</tr>
<tr>
<td>16:9 white on transparent</td>
<td>16x9_white</td>
</tr>
<tr>
<td>1:1 white on transparent</td>
<td>square_white</td>
</tr>
<tr>
<td>16:9 colour light on transparent</td>
<td>16x9 Colour_light</td>
</tr>
<tr>
<td>1:1 colour light on transparent</td>
<td>squareColour_light</td>
</tr>
<tr>
<td>16:9 colour dark on transparent</td>
<td>16x9 Colour_dark</td>
</tr>
<tr>
<td>1:1 colour dark on transparent</td>
<td>squareColour_dark</td>
</tr>
</tbody>
</table>

NOTE: The colour_dark and colour_light variants refer to the colours of the image so colour_light is a light coloured image for use on a dark background and colour_dark is a dark coloured image for use on a light background.

All images shall have a pixel aspect ratio of 1:1.

The list of image_variant query parameters listed in table 8 shall be used by ALL endpoints to validate image_variant query parameters. If a valid value from this list is used, the response shall not error but is not required to contain an image. If any other value is provided, then an HTTP 400 Bad Request error shall be returned.

The DVB-I client shall explicitly check that the response contains a HowRelated term that matches the requested image variant. Additional image variants may be added in the future so any RelatedMaterial elements with an unexpected or unrecognized HowRelated term shall be ignored.

If no image_variant is specified, then a backwards-compatible default variant shall be assumed by a Content Guide Server. If an image variant is requested the default variant shall not be included in the response, including in the case where the requested variant is unavailable.

The RelatedMaterial.HowRelated@href for a default image shall be set as urn:tva:metadata:cs:HowRelatedCS:2012:19

5.2.8.2.2 Image Resolution

The value of RelatedMaterial.MediaLocator.MediaUri shall represent the image_url for the image request. The client may request that the server perform image scaling by using the following query parameter:

<image_URL>?w=<width>

where:

- width is the width in pixels of the requested image. The original aspect ratio of the image shall determine the resulting image width - no cropping will be performed by the image resizing service.

5.2.8.3 Image Response

A Content Guide Server shall return an image of the required dimensions in JPEG or PNG format as specified in clause 7.1.1 of ETSI TS 102 796 [21], with the exception that GIF images are not supported. The format shall be specified in the MediaUri@contentType attribute. All images shall meet the following restrictions:

- Format: JPEG or PNG
- Colour Space: sRGB (either explicitly signalled or assumed if not)
- Colour Depth: 32 bits (8 bits per component)
The DVB-I client shall robustly handle situations where a referenced image is not available, i.e. an HTTP response code is returned indicating an unsuccessful request or retrieval fails for another reason.

For example, taking the following example section of a response from clause 5.2.8.2.2.

```xml
<RelatedMaterial>
  <!-- Promotional still image -->
  <MediaLocator>
    <MediaUri contentType="image/png">
      https://img-ctv.mdata.co.uk/channel7/service_a_linear.png</MediaUri>
    </MediaLocator>
  </RelatedMaterial>
```

**Figure 8: Example - Image Response**

In this instance, the complete image URL for the Service A image 200 pixels wide would be:

https://img-ctv.example.tv/channel7/service_a_linear.png?w=200

Assuming that the request is for a valid image, the response shall be a 200 (OK) HTTP response containing the requested image.

In the case that an unsupported width parameter is provided, a Content Guide Server shall respond with an HTTP 400 (Bad Request) response.

### 5.2.9 Extensibility

#### 5.2.9.1 Introduction

Certain aspects of the Service List Entry Points schema (see clause 5.3) and DVB-I service list schema (see clause 5.5) are extensible. Rather than the general extensibility offered through the use of the XML `<any>` and `<anyAttribute>` Wildcard Schema Components defined in W3C XML Schema [i.7], the present document defines a fixed extensibility mechanism based on inheritance of datatypes.

#### 5.2.9.2 Extensibility Base

The `ExtensionBaseType` defined in clause 5.5.23 is an abstract base type that 3rd parties extend to define concrete data types that can then be used to define elements in the XML instance document. This is an XML complexType and all 3rd party defined attributes and elements need to be contained within it. The `ExtensionBaseType@extensionName` attribute is mandatory and is used to convey information about the extension that can then aid validator functions.

### 5.2.10 Natural Language Processing

A DVB-I Service List or Service List Entry Points List allows certain elements to be repeated to convey the same information in different natural languages. Such elements use the `mpc7:textualType` datatype which allows the optional inclusion of an `@xml:lang` attribute, the value of which shall be a language code as defined by IETF BCP 47 [30]. Each such element shall only be repeated once per language code. If more than one language is provided for an element, each such element shall include the `@xml:lang` attribute.

Processing of `@xml:lang` attributes in DVB-I Content Guide Metadata is described in clause 6.4.3.
5.2.11 Interpreting Service Prominence

Article 7a of the European Audiovisual Media Services Directive [i.15] (AVMSD) allows for appropriate prominence to be applied to certain services, although makes no stipulation into how that prominence is to be reflected to the consumer which is determined by local regulations.

To convey the desired prominence of a service, the ProminenceList element, as defined in clause 5.5.27 is used. This element enables several schemes:

- simple flagging of a service as being prominent when none of the attributes of the Prominence sub-element are specified
- prominence relative to other prominent services with the @ranking attribute of the Prominence sub-element is used
- geographic applicability of equal prominence when the @country and/or @region attributes of the Prominence sub-element is used.
- relative prominence within specific viewing regions when the @ranking attribute is used in conjunction with the @country and/or @region attributes of the Prominence sub-element.

Note that the @country and @region attributes pertain to the location selected by the user as being their viewing region. If prominence is not defined for the selected viewing region, any prominence should be determined from the nearest ancestor region in the RegionList.

Depending on local regulations, it may be possible to realize prominence through the use of LCN numbers.

5.2.12 Instant Setup and Direct Tuning for DVB-S/S2/S2X Services

5.2.12.1 Introduction

A hybrid DVB-I client with one or more satellite tuners (IRD for DVB-S/S2/S2X) may use the mechanism described in clause 5.2.1 to attain the channel list or may use the mechanism described in the present section to access services purely based on information contained in the DVBSDeliveryParameters element of DVB-I service instances.

The mechanism hereunder is based on providing sufficient tuning information directly in the DVB-I service list and specifically in the DVBSDeliveryParameters element of each service instance to be able to tune to services without a separate DVB-SI based network scan. This enhances both the speed of the initial IRD first time installation and allows tuning to services that have not been part of previous broadcast network scans. It also guarantees that IRDs always have the latest tuning information available to them.

Any combination of the two methods in described in this clause 5.2.12 and clause 5.2.1, with in particular fallback mechanisms implemented, may guarantee that end-users can always access services in a reliable manner even if any one of the two mechanisms fails. This may be the case e.g. when new temporary services appear that have not been previously scanned, when DVB-I service lists contain errors in the delivery parameters of a given service, in specific Satellite Master Antenna TV (SMATV) installations or when services change satellite transponders and therefore are no longer tuneable as long as the IRD service database is out-of-date.

5.2.12.2 First Time Installation: Instant setup

The Hybrid DVB-I DVB-S/S2/S2X IRD may build the receiver service list directly from a DVB-I service list by:

- discarding instances that are not supported (see ContentAttributes element)
- using the tuning parameters contained in the DVBSDeliveryParameters element of selected instances and the LCNTable of the service for the selected Region and SubscriptionPackage (if applicable)
The IRD may support service instances with availability windows and multiple instances and behave accordingly, i.e. at the time of unavailability of the instance of highest priority the IRD shall switch to a service instance with a lower priority.

5.2.12.3 Direct Tuning

With traditional DVB-S/S2/S2X network scans, the information gathered during the initial setup phase tends to become outdated over time and services which have changed parameters e.g. different TSID and frequency (i.e. different triplet) are no longer receivable. As it is likely that Service Lists are kept more recent and are updated more frequently by hybrid DVB-I clients, they are more likely to contain up-to-date tuning information.

Up-to-date tuning information is especially important for temporary timed event channels, which may not be discovered by traditional DVB network scans. It is therefore recommended to provide sufficient information in the Service List to allow for a direct tuning based on the parameters contained in the `DVBSDeliveryParameters` of a service instance.

5.2.12.4 DVBSDeliveryParameters for Instant Setup and Direct Tuning

In order to allow the Instant Setup and Direct Tuning mechanism for DVB-S/S2/S2X services to be implemented in the context of DVB-I satellite service instances the tuning metadata elements shall be provided according to the following table:

<table>
<thead>
<tr>
<th>Metadata element</th>
<th>DVB-S/S2</th>
<th>DVB-S2X</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVTriplet</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>OrbitalPosition</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Frequency</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Polarization</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>SymbolRate</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>RollOff</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>ModulationSystem</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>ModulationType</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>FEC</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>ModcodMode</td>
<td>n/a</td>
<td>M</td>
</tr>
<tr>
<td>InputStreamIdentifier</td>
<td>n/a</td>
<td>M</td>
</tr>
<tr>
<td>ChannelBonding</td>
<td>n/a</td>
<td>O</td>
</tr>
</tbody>
</table>

Key: M – mandatory, R – highly recommended, n/a – not applicable, O – optional.

The use of metadata elements shall be consistent for all satellite service instances that are part of a Service List.

5.2.13 Service Instance Precedence

When selecting a service, and while playing a service as conditions change and if errors occur, a DVB-I client shall select one of the service’s instances to play, based on the precedence among the service instances, if there are more than one.

By default, the precedence among service instances within a service shall be as follows;

- Service instances outside their scheduled service hours (see clause 5.2.5) shall not be evaluated.
- When one of the service instances of the currently selected service changes from being inside their scheduled service hours to being outside or vice-versa, the selected service instance shall be re-evaluated.
- Service instances with a linked "application controlling media presentation" that cannot be started shall be discarded.

NOTE 1: Examples of a linked application that cannot be started include i) ones where the DVB-I client does not support a "linked application engine" for the format of the application and ii) if the DVB-I client gives the user the possibility of disabling the "linked application engine" and the user has done this.
• Service instances that contain video where the DVB-I client can determine in advance that it would not be able to display any video shall be discarded, similarly if for service instances that contain audio but where it would not be possible to output any audio.

NOTE 2: Examples include no signalled codec being supported, content being protected by a DRM technology not supported by the DVB-I client and content in a format that the DVB-I client does not support, e.g. content only available in UHD and a non-UHD-capable client.

• If a linked application attempts to obtain a DRM license and fails this fails then the linked application is responsible for communication with the end-user. The linked application may choose to continue running or exit.

• If a linked "application controlling media presentation" exits without a change of selected service and the DVB-I client is left without any media being presented then the selected service instance shall be re-evaluated discarding the service instance containing the linked application that just exited.

• Otherwise the signalled ServiceInstance@priority shall be respected.

DVB-I clients may permit users to over-ride these default precedence rules.

EXAMPLE: A terminal may permit users to indicate they have some form of bandwidth cap or quota such that broadcast should be preferred over broadband even if ServiceInstance@priority signals otherwise.

EXAMPLE: A terminal may permit users to set accessibility preferences that would result in a DVB-I client selecting a service instance that is a better fit with those accessibility preferences even if ServiceInstance@priority signals otherwise.

5.2.14 Extensions to the XML AIT

The XML AIT format described in clause 5.4 of ETSI TS 102 809 [5] is extended as follows:

• When it is desired to provide a free text description for an application, the inclusion of a Description element in the extended format of the application's applicationDescriptor element provides the description for that application.

The schema is provided in annex A.4 and in the electronic attachments described in annex B as dvbi_xmlait_extension_v1.0.xsd.

The following is an example of an XML AIT using this schema (informative):

```xml
<?xml version="1.0" encoding="UTF-8"?>
<mhp:ServiceDiscovery xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:mhp="urn:dvb:mhp:2009"
  <mhp:ApplicationDiscovery DomainName="broadcaster.com">
    <mhp:ApplicationList>
      <mhp:Application>
        <mhp:appName Language="eng">MyTV portal</mhp:appName>
        <mhp:applicationIdentifier>
          <mhp:orgId>123</mhp:orgId>
          <mhp:appId>456</mhp:appId>
        </mhp:applicationIdentifier>
        <mhp:applicationDescriptor xsi:type="dvbixmlait:DVBIApplicationDescriptor">
          <mhp:type>
            <mhp:OtherApp>application/vnd.hbbtv.xhtml+xml</mhp:OtherApp>
          </mhp:type>
          <mhp:controlCode>AUTOSTART</mhp:controlCode>
        </mhp:applicationDescriptor>
      </mhp:Application>
    </mhp:ApplicationList>
  </mhp:ApplicationDiscovery>
</mhp:ServiceDiscovery>
```
When this XMLAIT is used in conjunction with a Service containing a RelatedMaterial element which has a HowRelated@href="urn:dvb:metadata:cs:LinkedApplicationCS:2019:3" child element, then it contains information describing the home page application of the service provider. In this case it is an HbbTV application named “My TV Portal” which can be found at https://www.broadcaster.com/whizzo-app.html?a=1 and is described in English language as “Portal application for broadcaster”. According to the formatting for the icon@filename attribute in clause 5.4.4.6 of ETSI TS 102 809 [5], three icons are available to represent this home page application:

- A 32 x 32 pixel image for use with a square pixel display found at https://www.broadcaster.com/logos/broadcaster-1.0001.jpg
- A 24 x 32 pixel image for use on a 16:9 display found at https://www.broadcaster.com/logos/broadcaster-1.0004.jpg
- A 256 x 256 pixel image for use on a 4:3 display found at https://www.broadcaster.com/logos/broadcaster-1.0400.jpg

5.3 Service List Entry Points

5.3.1 Service List Entry Point schema
5.3.2 ServiceListEntryPoints

An XML instance document containing a `ServiceListEntryPoints` element is returned on interface F2 in response to a Service List Discovery query (see clause 5.1.3).

```xml
<element name="ServiceListEntryPoints" type="dvbisld:ServiceListEntryPointsType"/>
<complexType name="ServiceListEntryPointsType">
  <sequence>
    <element name="ServiceListRegistryEntity" type="dvbisld:OrganizationType"/>
    <element name="ProviderOffering" type="dvbisld:ProviderOfferingType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="Extension" type="dvbi-types:ExtensionBaseType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
  <attribute name="version" type="positiveInteger"/>
  <attribute ref="xml:lang" use="required"/>
</complexType>
```

### Table 9: Service List Entry Point Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>ServiceListEntryPoints</td>
<td>The reference element that points to one or more Service Lists hosted by one or more providers. This element is given as a response to a query on the F2 interface.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@version</td>
<td>The version number of the service list entry point data. Shall be incremented for every underlying change in the data of the Service List Registry.</td>
<td>Optional</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Specifies the natural language when not explicitly provided in a multilingual element.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>ServiceListRegistryEntity</td>
<td>The name and contact info of the organization managing the queried Service List Registry.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>ProviderOffering</td>
<td>A list of Service List Providers with the associated Service Lists. See note.</td>
<td>Optional</td>
</tr>
<tr>
<td>Extension</td>
<td>Additional elements and attributes defined by 3rd parties.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**NOTE:** If the ProviderOffering element is not present, it means that the query does not match any entry in the Service List Registry.

5.3.3 OrganizationType

```xml
<complexType name="OrganizationType">
  <complexContent>
    <extension base="mpeg7:AgentType">
      <sequence>
        <element name="Name" maxOccurs="unbounded">
          <complexType>
            <complexContent>
              <extension base="mpeg7:TextualType">
                <attribute name="type" use="optional">
                  <simpleType>
                    <restriction base="NMTOKEN">
                      <enumeration value="former"/>
                      <enumeration value="variant"/>  
                      <enumeration value="main"/>  
                    </restriction>
                  </simpleType>
                </attribute>
              </extension>
            </complexContent>
          </complexType>
        </element>
      </sequence>
    </extension>
  </complexContent>
</complexType>
```
<complexContent>
  <complexType>
    <element name="ProviderOfferingType">
      <sequence>
        <element name="Provider" type="dvbisld:OrganizationType" />
        <element name="ServiceListOffering" type="dvbi-types:ServiceListOfferingType" maxOccurs="unbounded" />
      </sequence>
    </element>
    <attribute name="regulatorFlag" type="boolean" default="false" />
  </complexType>
</complexContent>

Table 10: Organization Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name by which the organization is known. Multiple names can be specified as long as they are official variants of the main name.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
<tr>
<td>Kind</td>
<td>The nature of the organization (e.g. &quot;company&quot;, &quot;NGO&quot;, and so forth), which may be expressed using a controlled term.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>ContactName</td>
<td>The person who acts as the contact for the organization.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>A place that corresponds to the jurisdiction under which this organization is entered.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>Address</td>
<td>The address where the organization is located.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>ElectronicAddress</td>
<td>The electronic address information for this organization.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>regulatorFlag</td>
<td>Boolean value indicating if this is a recognized regulator for a country (e.g. according to the List of EU Audiovisual Regulators [i.4]). If not specified the default value is false.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.3.4 ProviderOfferingType

Table 11: Provider Offering Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider</td>
<td>The name and contact information of a Service List Provider whose offering is discoverable via the Service List Registry.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>ServiceListOffering</td>
<td>A list of details and locations of the Service List(s) offered by the Service List Provider at the specific Service List Entry Point.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
</tbody>
</table>
5.3.5 ServiceListOfferingType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="ServiceListOfferingType">
  <sequence>
    <element name="ServiceListName" type="mpeg7:TextualType" maxOccurs="unbounded" />
    <element name="ServiceListURI" type="dvbi-types:ExtendedURIType" maxOccurs="unbounded" />
    <element name="Delivery" type="dvbi-types:DeliveryType" />
    <element name="Language" type="tva:AudioLanguageType" minOccurs="0" maxOccurs="unbounded" />
    <element name="Genre" type="tva:GenreType" minOccurs="0" maxOccurs="unbounded" />
    <element name="TargetCountry" type="tva:ISO-3166-List" minOccurs="0" maxOccurs="unbounded" />
    <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded" />
    <element name="SRSSupport" minOccurs="0"> 
      <complexType>
        <attribute name="postcode" type="boolean" default="false" />
        <attribute name="regionID" type="boolean" default="false" />
        <attribute name="receivedMultiplex" type="boolean" default="false" />
      </complexType>
    </element>
    <element name="ServiceListId" type="ServiceIdentifierType" />
  </sequence>
  <attribute name="regulatorListFlag" type="boolean" default="false" />
  <attribute ref="xml:lang" />
</complexType>
```

### Table 12: Service List Offering Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
</table>
| ServiceListName     | The name of the service list in a human readable form. Multiple service list names can be specified as long as they have different @xml:lang values. See note 1.  
                      
                      This shall be the same as ServiceListName as in the ServiceList.Name element.                                                                                                                                | Mandatory 1 .. $\infty$ |
| ServiceListURI      | The URI where the Service List may be retrieved. Multiple URIs can be specified if the same Service List can be obtained from different servers.                                                                       | Mandatory 1 .. $\infty$ |
| Delivery            | Identifies the delivery methods used to deliver the services in the Service List. Indicating which of the delivery methods are required in order to offer an acceptable experience, as defined by the Service List Provider.  
                      
                      This enables a client to determine if all required delivery sources are available before attempting installation of the Service List.                                                                               | Mandatory 1 |
<p>| Language            | The audio language of the Service List's services. Multiple Language elements can be specified in case of multilingual contents. If no language is specified, responses to Service List Registry queries shall include the service list offering. | Optional 0 .. $\infty$ |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genre</td>
<td>The genre of the contents available for the service list according to the TV-Anytime standard If no genre are specified, responses to Service List Registry queries shall include the service list offering. A finer grain approach is possible by specifying the genre at the service level (i.e. ServiceList.Service.ServiceGenre). Similar to ServiceGenre, possible values are taken from: • ContentCS defined in ETSI TS 102 822-3-1 [7] • FormatCS defined in ETSI TS 102 822-3-1 [7] • ContentSubject defined in clause D.5</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>TargetCountry</td>
<td>The country code or a list of country codes indicating the countries where the service is intended to be received. If not specified, no regional constraints exist and the service can be received anywhere. See note 2.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>Additional material related to the service. Use to signal the following: • Service list logos, see clause 5.2.6.1</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>SRSSupport</td>
<td>Indicates which methods the Service List Server supports for server-side composing of service lists based on client provided information.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>@postcode</td>
<td>Indicates the server support postcode query (see clause 5.6.4.2)</td>
<td>Optional</td>
</tr>
<tr>
<td>@regionID</td>
<td>Indicates the server supports query through regionID (see clause 5.6.4.4)</td>
<td>Optional</td>
</tr>
<tr>
<td>@receivedMultiplex</td>
<td>Indicates the server supports query through receivable multiplex (see clause 5.6.4.3)</td>
<td>Optional</td>
</tr>
<tr>
<td>ServiceListId</td>
<td>The unique identifier of the Service List. This identifier should never be changed for a Service List, even if parameters of the Service List query are changed and it should be independent of the URI used to retrieve the Service List from the server. Refer to clause 5.2.2 for the suitable formats of the service identifier. The ServiceListId may be used by the client to confirm that a Service List returned by a server is the correct list, independent of its content. If the ServiceListId does not match the ServiceListOffering.ServiceListId it should be considered an error, the response to which is not defined by the present document.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@regulatorListFlag</td>
<td>Boolean value indicating if this is the “default list” for a country (e.g. according to the List of EU Audiovisual Regulators [1.4]). If not specified the default value is false</td>
<td>Optional</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Specifies the natural language when not explicitly provided in a multilingual element.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

NOTE 1: Refer to clause 5.2.10 for processing of multiple language elements.
NOTE 2: Particular attention shall be paid when using @regulatorList in conjunction with multiple target countries.

5.3.6 DeliveryType

5.3.6.1 Overview

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="DeliveryType">
    <sequence>
        <element name="DASHDelivery" type="dvbi-types:NoAdditionalIPParametersType" minOccurs="0"/>
        <element name="DVBTDelivery" type="dvbi-types:DVBTDeliveryType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="DVBCDelivery" type="dvbi-types:DVBCDeliveryType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="DVBSDelivery" type="dvbi-types:DVBSDeliveryType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="RTSPDelivery" type="dvbi-types:NoAdditionalIPParametersType" minOccurs="0"/>
        <element name="MulticastTSDelivery" type="dvbi-types:NoAdditionalIPParametersType" minOccurs="0"/>
    </sequence>
</complexType>
```
<element name="ApplicationDelivery" type="dvbi-types:ApplicationTypeListType" minOccurs="0"/>
<element name="OtherDeliveryParameters" type="dvbi-types:ExtensionBaseType" minOccurs="0"
    maxOccurs="unbounded"/>
</sequence>
</complexType>

Table 12a: DeliveryType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASHDelivery</td>
<td>Indicates that DVB-DASH delivery is used for one or more service instances in the Service List.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>DVBTDelivery</td>
<td>Indicates that DVB-T delivery is used for one or more service instances in the Service List.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td></td>
<td>Multiple DVBTDelivery with @required set to true shall each be considered mutually exclusive alternatives (using the logical OR operator), only one is required to be available on the client for the service list to be installed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each DVBTDelivery with @required set to false may optionally be used for one or more service instances in the Service List, if available on the client.</td>
<td></td>
</tr>
<tr>
<td>DVBCDelivery</td>
<td>Indicates that DVB-C delivery is used for one or more service instances in the Service List.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td></td>
<td>Multiple DVBCDelivery with @required set to true shall each be considered mutually exclusive alternatives (using the logical OR operator), only one is required to be available on the client for the service list to be installed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each DVBCDelivery with @required set to false may optionally be used for one or more service instances in the Service List, if available on the client.</td>
<td></td>
</tr>
<tr>
<td>DVBSDelivery</td>
<td>Indicates that DVB-S delivery is used for one or more service instances in the Service List.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td></td>
<td>Multiple DVBSDelivery with @required set to true shall each be considered mutually exclusive alternatives (using the logical OR operator), only one is required to be available on the client for the service list to be installed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each DVBSDelivery with @required set to false may optionally be used for one or more service instances in the Service List, if available on the client.</td>
<td></td>
</tr>
<tr>
<td>RTSPDelivery</td>
<td>Indicates that RTSP delivery is used for one or more service instances in the Service List.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>MulticastTSDelivery</td>
<td>Indicates that multicast UDP delivery is used for one or more service instances in the Service List.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>ApplicationDelivery</td>
<td>Indicates that an application is used to manage content delivery or is considered essential to the user experience by the Service List Provider, for one or more Services in the Service List.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td></td>
<td>Describes the types of application available. Each application type shall be a valid alternative for a client to use. A DVB-I client need only support one of the listed application types. This enables the provision of different application types for different DVB-I client platforms (e.g. TV, mobile).</td>
<td></td>
</tr>
<tr>
<td>OtherDeliveryParameters</td>
<td>Parameters defined for other delivery systems.</td>
<td>Optional 0 .. ∞</td>
</tr>
</tbody>
</table>
For Service List Registry queries, the Delivery values defined in table 12b shall be used, for each of the corresponding DeliveryTypes.

### Table 12b: Delivery Parameters for Service List Registry Queries

<table>
<thead>
<tr>
<th>Delivery</th>
<th>DeliveryType(s) required in query response Service List Offerings</th>
</tr>
</thead>
<tbody>
<tr>
<td>dvb-dash</td>
<td>DASHDelivery optionally in combination with MulticastTSDelivery</td>
</tr>
<tr>
<td>dvb-t</td>
<td>DVBTDelivery</td>
</tr>
<tr>
<td>dvb-c</td>
<td>DVBCDelivery</td>
</tr>
<tr>
<td>dvb-s</td>
<td>DVBSDelivery</td>
</tr>
<tr>
<td>dvb-iptv</td>
<td>MulticastTSDelivery and/or RTSPDelivery</td>
</tr>
<tr>
<td>application</td>
<td>ApplicationDelivery</td>
</tr>
</tbody>
</table>

5.3.6.2 AbstractDeliveryType

**NOTE:** This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="AbstractDeliveryType" abstract="true">
  <attribute name="required" type="boolean" default="false"/>
</complexType>
```

### Table 12c: AbstractDeliveryType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>@required</td>
<td>Indicates whether the delivery type must be supported by the DVB-I client and installed, in order to offer an acceptable experience as defined by the Service List Provider. A delivery type is installed when the related broadcast signal or IP network can be used by the client to retrieve DVB services. When set to true, the DVB-I client should only install the service list offering if the broadcast signal, IP network or application related to the delivery type can be used by the client to retrieve DVB services. When set to false, the delivery type is used by one or more service instances, but is not required (not essential) to offer an acceptable experience as defined by the Service List Provider. The DVB-I client can install the service list offering even if it does not support the delivery type.</td>
</tr>
<tr>
<td></td>
<td>Constraints: Optional</td>
</tr>
</tbody>
</table>

5.3.6.3 AbstractIPDeliveryType

**NOTE:** This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="AbstractIPDeliveryType" abstract="true">
  <complexContent>
    <extension base="dvbi-types:AbstractDeliveryType">
      <attribute name="minimumBitRate" type="unsignedInt"/>
    </extension>
  </complexContent>
</complexType>
```
Table 12d: AbstractIPDeliveryType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@minimumBitRate</td>
<td>Threshold bit-rate, in bits per second, under which a DVB-I client won’t be able to offer an acceptable experience, as defined by the Service List Provider.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.3.6.4  NoAdditionalIPParametersType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="NoAdditionalIPParametersType">
  <complexContent>
    <extension base="dvbi-types:AbstractIPDeliveryType">
      <!-- no additional elements or attributes -->
    </extension>
  </complexContent>
</complexType>
```

5.3.6.5  DVBTDeliveryType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="DVBTDeliveryType">
  <complexContent>
    <extension base="dvbi-types:AbstractDeliveryType">
      <sequence>
        <element name="OriginalNetworkID" type="dvbi-types:NetworkIdType" minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
      <attribute name="originalNetworkID" type="dvbi-types:NetworkIdType" use="optional">
        <annotation><documentation>The use of this attribute is deprecated.</documentation></annotation>
      </attribute>
    </extension>
  </complexContent>
</complexType>
```

Table 12e: DVBTDeliveryType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>OriginalNetworkID</td>
<td>Identifies an original network to which one or more service instances in the service list belong.</td>
<td>Optional</td>
</tr>
<tr>
<td>@originalNetworkID</td>
<td>Identifies the original network to which one or more service instances in the service list belong. The use of this attribute is deprecated in favour of signalling original network identifiers in the OriginalNetworkID element.</td>
<td>Deprecated! Optional</td>
</tr>
</tbody>
</table>

5.3.6.6  DVBCDeliveryType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="DVBCDeliveryType">
  <complexContent>
    <extension base="dvbi-types:AbstractDeliveryType">
      <attribute name="networkID" type="dvbi-types:NetworkIdType" use="required"/>
    </extension>
  </complexContent>
</complexType>
```
5.3.6.7 DVBSDeliveryType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="DVBSDeliveryType">
  <complexContent>
    <extension base="dvbi-types:AbstractDeliveryType">
      <sequence>
        <element name="OrbitalPosition" type="dvbi-types:LongitudeType" maxOccurs="unbounded"/>
      </sequence>
      <attribute name="originalNetworkID" type="dvbi-types:NetworkIdType" use="optional"/>
    </extension>
  </complexContent>
</complexType>
```

**Table 12g: DVBSDeliveryType Fields**

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@networkID</td>
<td>Identifies the cable network that delivers one or more service instances in the service list.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>OrbitalPosition</td>
<td>Identifies the orbital position of a satellite delivering one or more service instances in the service list. Expressed in positive or negative degrees representing east and west directions respectively.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
<tr>
<td>@originalNetworkID</td>
<td>Identifies the original network to which one or more service instances in the service list belong. The use of this attribute is deprecated as its meaning is historic and no longer used.</td>
<td>Deprecated! Optional</td>
</tr>
</tbody>
</table>

5.3.6.8 ApplicationTypeListType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="ApplicationTypeListType">
  <complexContent>
    <extension base="dvbi-types:AbstractDeliveryType">
      <sequence>
        <element name="ApplicationType" type="dvbi-types:ApplicationType" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>
```
Table 12h: ApplicationTypeListType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>ApplicationType</td>
<td>Describes the type of an application used to manage content delivery for one or more services in the Service List, as defined in clause 5.2.3.</td>
<td>Mandatory 1..∞</td>
</tr>
<tr>
<td></td>
<td>@contentType=&quot;application/vnd.dvb.ait+xml&quot;, the @xmlAitApplicationType attribute shall be included with a value as defined in ETSI TS 102 809 [5], clauses 5.2.2, 5.4.4.4 and 5.4.4.11.</td>
<td></td>
</tr>
</tbody>
</table>

5.3.6.9 ApplicationType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="ApplicationType">
  <attribute name="contentType" type="mpeg7:mimeType" use="required"/>
  <attribute name="xmlAitApplicationType" type="mpeg7:mimeType"/>
</complexType>
```

Table 12i: ApplicationType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@contentType</td>
<td>The MIME type of the application or application signalling, as defined in clause 5.2.3, table 7.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@xmlAitApplicationType</td>
<td>The Application Type as defined in ETSI TS 102 809 [5] clause 5.4.4.11 for an XML Application Information Table.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.4 Schema

5.4.1 Schema Declaration

```xml
         xmlns:dvbisd="urn:dvb:metadata:servicediscovery:2024"
         xmlns:dvbi-types="urn:dvb:metadata:servicediscovery-types:2023"
         xmlns:mpeg7="urn:tva:mpeg7:2008"
         xmlns:tva="urn:tva:metadata:2024"
         elementFormDefault="qualified"
         attributeFormDefault="unqualified">
  <import namespace="urn:dvb:metadata:servicediscovery-types:2023" schemaLocation="dvbi_types_v1.0.xsd"/>
  <import namespace="urn:tva:metadata:2024" schemaLocation="tva_metadata_3-1.xsd"/>
  <import namespace="urn:tva:mpeg7:2008" schemaLocation="tva_mpeg7.xsd"/>
  <import namespace="http://www.w3.org/XML/1998/namespace" schemaLocation="xml.xsd"/>
  <element name="ServiceList" type="dvbisd:ServiceListType"/>
</schema>
```

5.4.2 Entity Definitions

The following entities are defined in this schema for readability, maintainability and refined faceting.

```xml
<!DOCTYPE schema [
  <!ENTITY PostcodeChar   "A-Za-z0-9">
  <!ENTITY PostcodeSep    "\- ">
  <!ENTITY Postcode     "[&PostcodeChar;]+(&PostcodeSep;[&PostcodeChar;]+)?">
  <!ENTITY PostcodeWildFirst  "\*[&PostcodeChar;]*[&PostcodeSep;]7[&PostcodeChar;]+"  >
  <!ENTITY PostcodeWildMiddle "([&PostcodeChar;]\*[&PostcodeSep;]?[&PostcodeChar;]+)+([&PostcodeChar;]+[&PostcodeSep;]?[&PostcodeChar;]+)+">
  <!ENTITY PostcodeWildLast   "[&PostcodeChar;]+[&PostcodeSep;]?[&PostcodeChar;]+\*" ]>
```
5.5 Service Lists

5.5.1 ServiceList

An XML instance document containing a `ServiceList` element is returned on interface B2 in response to a service list query.

```xml
<element name="ServiceList" type="dvbisd:ServiceListType"/>
<complexType name="ServiceListType">
    <sequence>
        <element name="Name" type="mpeg7:TextualType" maxOccurs="unbounded"/>
        <element name="ProviderName" type="mpeg7:TextualType" maxOccurs="unbounded"/>
        <element name="LanguageList" type="dvbisd:LanguageListType" minOccurs="0"/>
        <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="RegionList" type="dvbisd:RegionListType" minOccurs="0"/>
        <element name="TargetRegion" type="dvbisd:RegionIdRefType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="LCNTableList" type="dvbisd:LCNTableListType" minOccurs="0"/>
        <choice minOccurs="0" maxOccurs="unbounded">
            <element name="ContentGuideSourceList" type="dvbisd:ContentGuideSourceListType"/>
            <element name="ContentGuideSource" type="dvbisd:ContentGuideSourceType"/>
        </choice>
        <choice minOccurs="0" maxOccurs="unbounded">
            <element name="Service" type="dvbisd:ServiceType"/>
            <element name="TestService" type="dvbisd:ServiceType"/>
        </choice>
        <element name="SubscriptionPackageList" type="SubscriptionPackageListType" minOccurs="0"/>
        <any namespace="#other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </sequence>
    <attribute name="id" type="dvbi-types:ServiceIdentifierType" use="required"/>
</complexType>
```

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PostcodeChar</td>
<td>The set of characters that are permitted in a postal code</td>
</tr>
<tr>
<td>PostcodeSep</td>
<td>The separator characters that may be used in a postcode, generally only one separator is permitted in a postcode</td>
</tr>
<tr>
<td>Postcode</td>
<td>One or more characters, and optional separator and then one or more characters</td>
</tr>
<tr>
<td>PostcodeWildFirst</td>
<td>A postcode with the wildcard matching character in the first position</td>
</tr>
<tr>
<td>PostcodeWildMiddle</td>
<td>A postcode with the wildcard matching character in middle. This is defined as being one of two options, before the separator or after it</td>
</tr>
<tr>
<td>PostcodeWildLast</td>
<td>A postcode with the wildcard matching character in the last position</td>
</tr>
<tr>
<td>DecimalByte</td>
<td>The decimal representation of a byte</td>
</tr>
<tr>
<td>IPv4Address</td>
<td>Four decimal bytes separated by periods</td>
</tr>
<tr>
<td>HexDigit</td>
<td>The set of characters that are permitted in the hexadecimal representation of a number</td>
</tr>
<tr>
<td>Hex32</td>
<td>1 to 8 hexadecimal digits representing the values 0 through FFFFFFFF</td>
</tr>
<tr>
<td>Hex16</td>
<td>1 to 4 hexadecimal digits representing the values 0 through FFFF</td>
</tr>
<tr>
<td>Hex8</td>
<td>1 or 2 hexadecimal digits representing the values 0 through FF</td>
</tr>
</tbody>
</table>
<attribute name="version" type="positiveInteger" use="required"/>
<attribute name="responseStatus" use="optional">
  <simpleType>
    <restriction base="string">
      <enumeration value="OK"/>
      <enumeration value="ERROR_INVALID_MUX_INFO"/>
      <enumeration value="ERROR_INVALID_REQUEST"/>
      <enumeration value="ERROR_BUSY"/>  
      <enumeration value="ERROR_GENERIC_FAILURE"/>
      <enumeration value="ERROR_INVALID_POSTCODE"/>
      <enumeration value="ERROR_INVALID_REGION_ID"/>
    </restriction>
  </simpleType>
</attribute>
<attribute ref="xml:lang" use="required"/>
</complexType>
<complexType name="LanguageListType">
  <sequence>
    <element name="Language" type="tva:AudioLanguageType" maxOccurs="unbounded"/>
  </sequence>
</complexType>

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>ServiceList</td>
<td>A list of the details and locations of IP services offered by the service provider. A service provider can divide their services into multiple service lists for administrative convenience.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Name</td>
<td>The name of this service list in a human readable form. Multiple service list names can be specified as long as they have different @xml:lang values. See note.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
<tr>
<td>ProviderName</td>
<td>The name of the provider of this service list in a human readable form. Multiple values for the provider name can be specified as long as they have different @xml:lang values. See note.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
<tr>
<td>LanguageList</td>
<td>A list of audio languages related to the Service List's services. The list of languages will be the same as those shown when the ServiceList is returned as a ServiceListOffering in a ServiceList Registry response (see clause 5.3.5).</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>Additional material related to the service. Use to signal the following:</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td></td>
<td>• Service list logos, see clause 5.2.6.1.</td>
<td></td>
</tr>
<tr>
<td>RegionList</td>
<td>A list of geographic regions with logical identifiers that are used to provide regionalization of the service list or services in the service list.</td>
<td>Optional</td>
</tr>
<tr>
<td>TargetRegion</td>
<td>The identifiers of those regions specified in the RegionList for which this service list is targeted.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>LCNTableList</td>
<td>The list of tables that define regionalized and packaged logical channel numbers for the services in this service list.</td>
<td>Optional</td>
</tr>
<tr>
<td>ContentGuideSourceList</td>
<td>A list of content guide sources providing schedule and programme metadata for one or more services, through the ContentGuideSourceRef element, in this service list.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>ContentGuideSource</td>
<td>The details of a content guide source providing schedule and programme metadata for all services in this service list that do not have their own ContentGuideSource element.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>Service</td>
<td>The services that are part of this service list.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>TestService</td>
<td>The services that are provided for testing purposes within this service list. Note that these services should not generally be selectable unless some specific capability is enabled in the DVB-I client.</td>
<td>Optional 0 .. ∞</td>
</tr>
</tbody>
</table>
Table 15: ServiceType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>UniqueIdentifier</td>
<td>The unique ID of the service. This ID should never be changed for a service, even if all other parameters of the service are changed. Refer to clause 5.2.2 for the suitable formats of the service identifier.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>ServiceInstance</td>
<td>The instances(s) where the A/V content for the service may be found. If multiple elements of this type are present and available (refer to clause 5.2.5), the one with the lowest value of the @priority attribute has the highest priority. All service instances for a given service carry the same editorial content.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>ProviderName</td>
<td>The name of the service provider.</td>
<td>Optional</td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>The material related to the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>ServiceGenre</td>
<td>The genre of the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>ServiceDescription</td>
<td>The description of the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>RecordingInfo</td>
<td>The recording information for the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>ContentGuideServiceRef</td>
<td>The content guide service reference for the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>AdditionalServiceParameters</td>
<td>The additional service parameters.</td>
<td>Optional</td>
</tr>
<tr>
<td>NVID</td>
<td>The unique identifier of the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>ProminenceList</td>
<td>The prominence list for the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>ParentalRating</td>
<td>The parental rating for the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Specifies the natural language when not explicitly provided in a multilingual element.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

Note: Refer to clause 5.2.10 for processing of multiple language elements.
<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>TargetRegion</td>
<td>The region identifier(s), as denoted by RegionID, of the regions where the service is intended to be received. If not specified, no regional constraints exist and the service can be received anywhere.</td>
<td>Optional</td>
</tr>
<tr>
<td>serviceName</td>
<td>The name of the service. Multiple service names can be specified as long as they have different @xml:lang values. See note 1.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>ProviderName</td>
<td>The name of the provider of this service in a human readable form. This element should include an @xml:lang attribute to identify the language being used. See note 1.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>Additional material related to the service. Use to signal the following:</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>• Out of service banners, see clause 5.2.5.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Service related applications, see clause 5.2.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Service logos, see clause 5.2.6.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Service banner, see clause 5.2.6.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Content finished banner, see clause 5.2.7.3</td>
<td></td>
</tr>
<tr>
<td>ServiceGenre</td>
<td>A genre that characterizes the programming on the service. Possible values are taken from:</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>• ContentCS defined in ETSI TS 102 822-3-1 [7]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• FormatCS defined in ETSI TS 102 822-3-1 [7]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ContentSubject defined in clause D.5</td>
<td></td>
</tr>
<tr>
<td>ServiceType</td>
<td>Identifies the representation of the service, selected from the values available in the ServiceTypeClassification scheme (see clause D.4). If not specified, the service contains linear television.</td>
<td>Optional</td>
</tr>
<tr>
<td>RecordingInfo</td>
<td>In some territories this signalling may help a DVB-I client determine whether or not the content from this service may be recorded, time-shifted and/or redistributed. How clients make use of this signalling is not defined by the present document. The value for this element should be taken from the RecordingInfoCS defined in clause D.4.</td>
<td>Optional</td>
</tr>
<tr>
<td>ContentGuideSource</td>
<td>The details of a content guide source providing schedule and programme metadata for this service. Overrides a ContentGuideSource defined at ServiceList level.</td>
<td>Optional</td>
</tr>
<tr>
<td>ContentGuideSourceRef</td>
<td>The ID referencing a ContentGuideSource defined in the ContentGuideSourceList.</td>
<td>Optional</td>
</tr>
<tr>
<td>AdditionalServiceParameters</td>
<td>Elements and attributes that are defined by 3rd parties to convey additional information about the service.</td>
<td>Optional</td>
</tr>
<tr>
<td>NVOD</td>
<td>Defines the role of the service in regards to a NVOD offering. Refer to clause 5.5.26 for a description of the values conveyed in this element.</td>
<td>Optional</td>
</tr>
<tr>
<td>ProminenceList</td>
<td>List of geographic regions where prominence, according to article 7a of the EU Audiovisual Media Services Directive (“AVMSD”) [i.15], is applied for this service.</td>
<td>Optional</td>
</tr>
<tr>
<td>ParentalRating</td>
<td>The parental rating of the service. Defines the minimum age required in order to view the service (see clause 5.5.28). Different minimum age ratings may be defined for different countries.</td>
<td>Optional</td>
</tr>
<tr>
<td>@dynamic</td>
<td>Indicates whether the programme content on the service is reactive and dynamically scheduled (see clause 6.5.3.2).</td>
<td>Optional</td>
</tr>
<tr>
<td>@version</td>
<td>The version number of the service. Shall be incremented for every published change.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@replayAvailable</td>
<td>Indicates that the service provides on demand playback of one or more previously aired programs. See note 2.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
5.5.3 Convenience Types

5.5.3.1 ServiceIdentifierType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

<complexType name="ServiceIdentifierType">
    <simpleContent>
        <restriction base="anyURI"/>
    </simpleContent>
</complexType>

5.5.3.2 SubscriptionPackageType

<complexType name="SubscriptionPackageType">
    <simpleContent>
        <extension base="mpeg7:TextualType"/>
    </simpleContent>
</complexType>

5.5.4 ServiceInstanceType

<complexType name="ServiceInstanceType">
    <sequence>
        <element name="DisplayName" type="mpeg7:TextualType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="ContentProtection" type="dvbisd:ContentProtectionType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="ContentAttributes" type="dvbisd:ContentAttributesType" minOccurs="0"/>
        <element name="Availability" type="dvbisd:ServiceAvailabilityType" minOccurs="0"/>
        <element name="SubscriptionPackage" type="dvbisd:SubscriptionPackageType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="FTAContentManagement" type="dvbisd:FTAContentManagementType" minOccurs="0"/>
        <element name="SourceType" type="anyURI" minOccurs="0"/>
    </sequence>
    <element name="AltServiceName" type="string" minOccurs="0" maxOccurs="unbounded"/>
    <choice minOccurs="0">
        <sequence>
            <element name="DVBTDeliveryParameters" type="dvbisd:DVBTDeliveryParametersType"/>
        </sequence>
        <sequence>
            <element name="SATIPDeliveryParameters" type="dvbisd:SATIPDeliveryParametersType" minOccurs="0"/>
        </sequence>
        <sequence>
            <element name="DVBSDeliveryParameters" type="dvbisd:DVBSDeliveryParametersType"/>
        </sequence>
        <sequence>
            <element name="SATIPDeliveryParameters" type="dvbisd:SATIPDeliveryParametersType" minOccurs="0"/>
        </sequence>
        <sequence>
            <element name="DVBCDeliveryParameters" type="dvbisd:DVBCDeliveryParametersType"/>
        </sequence>
        <sequence>
            <element name="RTSPDeliveryParameters" type="dvbisd:RTSPDeliveryParametersType"/>
        </sequence>
        <sequence>
            <element name="MulticastTSDeliveryParameters" type="dvbisd:MulticastTSDeliveryParametersType"/>
        </sequence>
        <sequence>
            <element name="DASHDeliveryParameters" type="dvbisd:DASHDeliveryParametersType"/>
        </sequence>
        <sequence>
            <element name="MulticastTSDeliveryParameters" type="dvbisd:MulticastTSDeliveryParametersType"/>
        </sequence>
    </choice>
</complexType>
### Table 16: ServiceInstanceType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>DisplayName</td>
<td>Human-readable name of the service associated to this service instance. Multiple names may be provided as long as they all have different @xml:lang attributes. When not present, ServiceName is used. See note.</td>
<td>Optional</td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>Additional material related to the service. Use to signal the following:</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>• Service related applications, see clause 5.2.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Service logos, see clause 5.2.6.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Content finished banner, see clause 5.2.7.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any related material with a particular value of HowRelated that is provided within a ServiceInstance element supersedes any corresponding related material with that value of HowRelated that is provided within a Service element.</td>
<td></td>
</tr>
<tr>
<td>ContentProtection</td>
<td>Denotes the content protection schemes being used for this service instance, together with their corresponding identifiers.</td>
<td>Optional</td>
</tr>
<tr>
<td>ContentAttributes</td>
<td>The attributes of the audio, video, and access services provided by the media, for example subtitles and sign language of this service instance.</td>
<td>Optional</td>
</tr>
<tr>
<td>Availability</td>
<td>Indicates the period(s) in time when this service instance is active. See also clause 5.2.5.</td>
<td>Optional</td>
</tr>
<tr>
<td>SubscriptionPackage</td>
<td>Identifies the subscription packages in which this service instance is included (see clause 5.1.5). If present, this service instance is selectable only by a DVB-I client that is associated to one of the SubscriptionPackage elements listed here. If not specified, no subscription package constraints exist and the service instance can be selected regardless of any subscription package associated with the DVB-I client (e.g. selected during installation of the service list).</td>
<td>Optional</td>
</tr>
<tr>
<td>FTAContentManagement</td>
<td>DVB-I service instances not using DRM may carry a FTAContentManagement element to define the content management policy for the service instance. The semantics of each attribute are those defined for the correspondingly named fields of the FTA_content_management_descriptor defined in clause 6.2.18.0 of ETSI EN 300 468 [6].</td>
<td>Optional</td>
</tr>
<tr>
<td>Name</td>
<td>Semantic Definition</td>
<td>Constraints</td>
</tr>
<tr>
<td>------</td>
<td>---------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>SourceType</td>
<td>Identifies the primary delivery source for this service instance and thus determines the required delivery parameters according to table 17. The use of this element is deprecated in this version of the specification, in favour of the client application making a delivery system determination based on the specified delivery parameters.</td>
<td>Deprecated! Optional 0 .. 1</td>
</tr>
<tr>
<td>AltServiceName</td>
<td>Name(s) to use in combination with ServiceName when matching this service instance with a service from a broadcast signal. Multiple alternative names can be specified, for broadcasts that may use different service name variants (e.g. Channel 1, Channel One, Channel 1 HD). When not present, only ServiceName is used for service instance matching.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>DVBTDeliveryParameters</td>
<td>Delivery parameters for DVB-T services.</td>
<td>Optional Choice</td>
</tr>
<tr>
<td>DVBSDeliveryParameters</td>
<td>Delivery parameters for DVB-S services.</td>
<td></td>
</tr>
<tr>
<td>DVBCDeliveryParameters</td>
<td>Delivery parameters for DVB-C services.</td>
<td></td>
</tr>
<tr>
<td>RTSPDeliveryParameters</td>
<td>Delivery parameters for RTSP based services.</td>
<td></td>
</tr>
<tr>
<td>MulticastTSDeliveryParameters</td>
<td>Delivery parameters for services delivered using multicast UDP.</td>
<td></td>
</tr>
<tr>
<td>SATIPDeliveryParameters</td>
<td>Provides parameters that a DVB-I client supporting SAT&gt;IP as a “thin client” can use to receive the service instance from a SAT&gt;IP server.</td>
<td></td>
</tr>
<tr>
<td>OtherDeliveryParameters</td>
<td>Parameters defined for other delivery systems.</td>
<td></td>
</tr>
<tr>
<td>IdentifierBasedDeliveryParameters</td>
<td>An identifier in the form of a locator (URL) or name (URN) that contains the parameters of the relevant delivery system for this service instance. While the DVB-I client may parse the identifier into its constituent elements in order to route it to an appropriate handler, the semantics of individual parameter values are opaque to it.</td>
<td></td>
</tr>
<tr>
<td>@priority</td>
<td>The priority of this service instance relative to the other service instances of the service. Lower values of this attribute indicate a higher priority. Selection between service instances which have the same priority is implementation dependant.</td>
<td>Optional</td>
</tr>
<tr>
<td>@id</td>
<td>An identifier of this service instance, primarily used to link with program metadata defined in ETSI TS 102 822-3-1 [7].</td>
<td>Optional</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Specifies the natural language when not explicitly provided in a multilingual element.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**NOTE:** Refer to clause 5.2.10 for processing of multiple language elements.

### Table 17: Required Delivery Parameters for each Source Type

<table>
<thead>
<tr>
<th>SourceType</th>
<th>Required Delivery Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>urn:dvb:metadata:source:dvb-t</td>
<td>DVBTDeliveryParameters with optional SATIPDeliveryParameters</td>
</tr>
<tr>
<td>urn:dvb:metadata:source:dvb-s</td>
<td>DVBSDeliveryParameters with optional SATIPDeliveryParameters</td>
</tr>
<tr>
<td>urn:dvb:metadata:source:dvb-c</td>
<td>DVBCDeliveryParameters</td>
</tr>
<tr>
<td>urn:dvb:metadata:source:dvb-iptv</td>
<td>MulticastTSDeliveryParameters or RTSPDeliveryParameters</td>
</tr>
<tr>
<td>urn:dvb:metadata:source:dvb-dash</td>
<td>DASHDeliveryParameters with optional MulticastTSDeliveryParameters</td>
</tr>
<tr>
<td>urn:dvb:metadata:source:application</td>
<td>None (application signalled by means of a RelatedMaterial element)</td>
</tr>
</tbody>
</table>
5.5.5  ContentAttributesType

<complexType name="ContentAttributesType">
  <sequence>
    <element name="AudioAttributes" type="tva:AudioAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="AudioConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="unbounded">
      <annotation>
        <documentation>The use of this element is deprecated.</documentation>
      </annotation>
    </element>
    <element name="VideoAttributes" type="dvbisd:VideoAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="VideoConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="0"/>
    <element name="AccessibilityAttributes" type="tva:AccessibilityAttributesType" minOccurs="0"/>
  </sequence>
</complexType>

Table 18: ContentAttributesType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>AudioAttributes</td>
<td>The attributes of any audio component in the service. Only leaf term values from the following classification schemes are permitted values for Coding@href (see also note 1) &lt;ul&gt;&lt;li&gt; urn:dvb:metadata:cs:AudioCodecCS:2007&lt;/li&gt; &lt;li&gt; urn:dvb:metadata:cs:AudioCodecCS:2020&lt;/li&gt; &lt;li&gt; urn:mpeg:mpeg7:cs:AudioCodingFormatCS:2001&lt;/li&gt;&lt;/ul&gt;</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>AudioConformancePoint</td>
<td>The conformance point, according to urn:dvb:metadata:cs:AudioConformancePointsCS:2017 (see note 2) as defined in ETSI TS 101 154 [22], denoting audio formats that may be used in the service. The use of this element is deprecated in favour of the AudioAttributes element which more precisely conveys the properties of audio components within the service.</td>
<td>Deprecated! Optional 0 .. ∞</td>
</tr>
<tr>
<td>VideoConformancePoint</td>
<td>The conformance point, according to the leaf terms values from either of the following classification schemes (see notes 1 and 2) as defined in ETSI TS 101 154 [22], denoting the video format that may be used in the service &lt;ul&gt;&lt;li&gt; urn:dvb:metadata:cs:VideoConformancePointsCS:2017&lt;/li&gt; &lt;li&gt; urn:dvb:metadata:cs:VideoConformancePointsCS:2021&lt;/li&gt; &lt;li&gt; urn:dvb:metadata:cs:VideoConformancePointsCS:2022&lt;/li&gt;&lt;/ul&gt;</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>AccessibilityAttributes</td>
<td>The attributes of available access services. See clause 4.4 for further details on supported access services and the signalling of attributes.</td>
<td>Optional 0 .. 1</td>
</tr>
</tbody>
</table>

NOTE 1: Subsequent versions of the DVB classification schemes will carry the same main part of the namespace up to the year which denotes a revision in order to permit wildcard based disambiguation of identifiers.

NOTE 2: Classification schemes in the urn:dvb namespace can be found at https://www.dvb.org/metadata/.

NOTE 3: Availability and properties of media streams providing accessibility features are signalled in the AccessibilityAttributes element (and not signalled with the AudioAttributes and VideoAttributes of the main program).

NOTE: CaptionLanguage and SignLanguage are legacy fields defined in a former version of the present document and are no longer supported.
Note that all audio formats expressed through the `AudioAttributes` and `AudioConformancePoint` elements may be present in the service and that all visual formats specified through the `VideoAttributes` and `VideoConformancePoint` elements may be present in the service, i.e. the values from the elements are combinatorial.

5.5.6 ContentGuideSourceListType

```xml
<complexType name="ContentGuideSourceListType">
  <sequence>
    <element name="ContentGuideSource" type="dvbisd:ContentGuideSourceType" maxOccurs="unbounded"/>
  </sequence>
  <attribute ref="xml:lang"/>
</complexType>
```

Table 19: ContentGuideSourceListType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>ContentGuideSource</td>
<td>The details of a content guide source providing metadata for one or more services in the service list.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Specifies the natural language when not explicitly provided in a multilingual element.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.5.7 ContentGuideSourceType

```xml
<complexType name="ContentGuideSourceType">
  <sequence>
    <element name="Name" type="mpeg7:TextualType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ProviderName" type="mpeg7:TextualType" maxOccurs="unbounded"/>
    <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ScheduleInfoEndpoint" type="dvbi-types:ExtendedURIType"/>
    <element name="ProgramInfoEndpoint" type="dvbi-types:ExtendedURIType" minOccurs="0"/>
    <element name="GroupInfoEndpoint" type="dvbi-types:ExtendedURIPathType" minOccurs="0"/>
    <element name="MoreEpisodesEndpoint" type="dvbi-types:ExtendedURIType" minOccurs="0"/>
  </sequence>
  <attribute name="CGSID" type="dvbisd:ContentGuideProviderIdType" use="required"/>
  <attribute name="minimumMetadataUpdatePeriod" type="duration"/>
  <attribute ref="xml:lang"/>
</complexType>
```

```xml
<simpleType name="ContentGuideProviderIdType">
  <restriction base="ID"/>
</simpleType>
```

```xml
<simpleType name="ContentGuideProviderRefIdType">
  <restriction base="IDREF"/>
</simpleType>
```

Table 20: ContentGuideSourceType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name of the content guide source. Multiple content guide names can be specified as long as they have different @xml:lang values. See note.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>ProviderName</td>
<td>The name of the provider of this content guide source in a human readable form. This element should include an @xml:lang attribute to identify the language being used. See note.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>Additional material related to the content guide as a whole. Used to signal the following: • Content Guide Source logos, see clause 5.2.6.3</td>
<td>Optional 0 .. ∞</td>
</tr>
</tbody>
</table>
### ScheduleInfoEndpoint

The scheme, authority and path syntax components of a URL for the endpoint of the API providing schedule metadata from this content guide source. The `@contentType` attribute should be set to `application/xml` denoting that the endpoint will provide an XML document according to clause 6.5.4.

**Constraints:**
- **Mandatory**

### ProgramInfoEndpoint

The scheme, authority and path syntax components of a URL for the endpoint of the API providing detailed programme metadata for specific programmes from this content guide source. This metadata provides additional details to complement basic programme details provided by a schedule endpoint. The `@contentType` attribute should be set to `application/xml` denoting that the endpoint will provide an XML document according to clause 6.6.3.

**Constraints:**
- **Optional**

### GroupInfoEndpoint

The scheme, authority and path syntax components of a URL for the endpoint of the API providing programme grouping data (e.g. series) from this content guide source. The `@contentType` attribute should be set to `application/xml` denoting that the endpoint will provide an XML document according to clauses 6.8.2.3, 6.8.3.3 and 6.8.4.3.

**Constraints:**
- **Optional**

### MoreEpisodesEndpoint

The scheme, authority and path syntax components of a URL for the endpoint of the API providing programme metadata and group metadata for programmes in the same group as the programme used to make the request. The `@contentType` attribute should be set to application/xml denoting that the endpoint will provide an XML document according to clause 6.7.3.

**Constraints:**
- **Optional**

### @CGSID

The unique ID of the `ContentGuideSource` in the `ContentGuideSourceList`. This ID can be used to reference a common `ContentGuideSource` definition in the `ContentGuideSourceList`, when multiple services in the service list use the same source of content guide data.

**Constraints:**
- **Mandatory**

### @minimumMetadataUpdatePeriod

This indicates the minimum update period for metadata provided by the `ContentGuideSource` for end-points that may require polling (see clause 6.5.3.2).

**Constraints:**
- **Optional**

### @xml:lang

Specifies the natural language when not explicitly provided in a multilingual element.

**Constraints:**
- **Optional**

**NOTE:** Refer to clause 5.2.10 for processing of multiple language elements.

### 5.5.8 DVBTripletType

This definition of DVBTripletType is adapted from the DVBTriplet defined in ETSI TS 102 034 [4].

**NOTE:** This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="DVBTripletType">
  <attribute name="origNetId" type="dvbi-types:OrigNetId" use="optional"/>
  <attribute name="tsId" type="dvbi-types:TSId" use="optional"/>
  <attribute name="serviceId" type="dvbi-types:ServiceId" use="required"/>
</complexType>
```

**Table 21: DVBTripletType Fields**

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@origNetId</td>
<td>Refer to clause 5.2.12.8 of ETSI TS 102 034 [4] for semantic definition of the OrigNetId attribute. The present document allows this attribute to be omitted.</td>
<td>Optional</td>
</tr>
<tr>
<td>@tsId</td>
<td>Refer to clause 5.2.12.8 of ETSI TS 102 034 [4] for semantic definition of the TSId attribute. The present document allows this attribute to be omitted.</td>
<td>Optional</td>
</tr>
<tr>
<td>@serviceId</td>
<td>Refer to clause 5.2.12.8 of ETSI TS 102 034 [4] for semantic definition of the ServiceId attribute.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
5.5.9 ExtendedURIType and ExtendedURIPathType

Used to provide a URI with additional information.

NOTE: These datatypes are defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="ExtendedURIType">
    <sequence>
        <element name="URI" type="anyURI"/>
    </sequence>
    <attribute name="contentType" type="mpeg7:mimeType" use="required"/>
</complexType>
```

Table 22: ExtendedURIType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>URI</td>
<td>The URI providing the location of the service.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@contentType</td>
<td>The MIME type of the object identified by the URI.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

```xml
<complexType name="ExtendedURIPathType">
    <sequence>
        <element name="URI">
            <simpleType>
                <restriction base="anyURI">
                    <pattern value=".+"/>
                </restriction>
            </simpleType>
        </element>
    </sequence>
    <attribute name="contentType" type="mpeg7:mimeType" use="required"/>
</complexType>
```

Table 22a: ExtendedURIPathType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>URI</td>
<td>The path component of a URI.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@contentType</td>
<td>The MIME type of the object identified by the URI.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

5.5.10 LCNTableEntryType

```xml
<complexType name="LCNTableEntryType">
    <attribute name="channelNumber" type="positiveInteger" use="required"/>
    <attribute name="serviceRef" type="dvbi-types:ServiceIdentifierType" use="required"/>
    <attribute name="selectable" type="boolean" default="true"/>
    <attribute name="visible" type="boolean" default="true"/>
</complexType>
```

Table 23: LCNTableEntryType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@channelNumber</td>
<td>The logical channel number. The semantics for this attribute are the same as for the logical_channel_number field in the ciplus_service_descriptor (see annex N.1.2.3 of CI Plus™ [2]).</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@serviceRef</td>
<td>Reference to the service identified by UniqueIdentifier defined in this service list for the logical channel number.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
**@selectable**

A flag indicating whether the service should be selectable via direct numerical entry of the logical channel number. This flag is only interpreted when the `visible` flag is set to `false`. When set to `true`, the flag indicates that the hidden service is selectable by direct entry of the logical channel number; when set to `false`, then the hidden service is not directly selectable by the user (but may be selectable by LCN from an application environment).

**@visible**

A flag indicating whether the service should be included in any service list or EPG presented to the viewer. When set to `true`, this flag indicates that the service is normally visible via the Host service or channel list and EPG etc. When set to `false`, this indicates that the receiver is not expected to offer the service to the user in normal navigation modes but the receiver shall provide a mechanism to access these services by direct entry of the logical channel number, depending on the setting of the `selectable` flag.

### 5.5.11 LCNTableListType

```xml
<complexType name="LCNTableListType">
  <sequence>
    <element name="LCNTable" type="dvbisd:LCNTableType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
</complexType>
```

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCNTable</td>
<td>A channel number table representing an ordered sequence of services irrespective of the position of the service in the service list.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

### 5.5.12 LCNTableType

```xml
<complexType name="LCNTableType">
  <sequence>
    <element name="TargetRegion" type="dvbisd:RegionIdRefType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="SubscriptionPackage" type="dvbisd:SubscriptionPackageType" minOccurs="0" maxOccurs="unbounded">  
      <annotation><documentation>The use of this element is deprecated.</documentation></annotation>
    </element>
    <element name="LCN" type="dvbisd:LCNTableEntryType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="LCNRange" type="dvbisd:LCNRangeType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
  <attribute name="preserveBroadcastLCN" type="boolean" default="false"/>
</complexType>
```
Table 25: LCNTableType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>TargetRegion</td>
<td>The region identifier(s), as denoted by RegionID, of the regions where the LCN table applies. If not specified, no regional constraints exist and the LCN table is applicable anywhere.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>SubscriptionPackage</td>
<td>Identifies the subscription packages to which this LCN table applies (see clause 5.1.5). If not specified, the LCN table is applicable to any subscription package, though more suitable LCN tables for particular subscription packages could also be present.</td>
<td>Deprecated! Optional 0 .. ∞</td>
</tr>
<tr>
<td>LCN</td>
<td>Describes a channel number to service mapping.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>LCNRange</td>
<td>Describes a range of channel numbers to map to channels without an explicit LCN mapping (i.e. channels without a corresponding LCNTable.LCN).</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>@preserveBroadcastLCN</td>
<td>Determines whether a client should preserve LCNs allocated to non-DVB-I broadcast services from broadcast network(s) targeted by the installation (e.g. non-DVB-I national terrestrial services, services from the applicable bouquet). Broadcast LCN allocations shall only be preserved if there is no conflict with an LCN defined by the LCNTable. In the case of a conflict, the LCNTable allocation takes precedence and the non-DVB-I broadcast service shall be allocated another LCN. A client should allocate an LCN according to an applicable LCNRange if defined.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

When installing a Service List that uses LCN tables, following selection of the region and/or subscription package (if either or both are specified), a single LCNTable shall be selected. Different LCN tables are not intended to be combined by the DVB-I client. Therefore, there shall be only one applicable LCNTable in the Service List:

- in total, when no TargetRegion and SubscriptionPackage are used,
- for each unique TargetRegion when no SubscriptionPackage is used,
- for each unique SubscriptionPackage when no TargetRegion is used,
- for each unique combination of TargetRegion and SubscriptionPackage, when both TargetRegion and SubscriptionPackage are used.

5.5.13 McastType

For semantic and syntax definitions, refer to clause 5.2.12.14 of ETSI TS 102 034 [4].

5.5.14 RTSPURLType

For semantic and syntax definitions, refer to clause 5.2.12.30 of ETSI TS 102 034 [4].

5.5.15 ServiceAvailabilityType

```xml
<complexType name="ServiceAvailabilityType">
  <sequence>
    <element name="Period" maxOccurs="unbounded"/>
  </complexType>
  <sequence>
    <element name="Interval" minOccurs="0" maxOccurs="unbounded"/>
  </complexType>
  <attribute name="days" type="dvbisd:ServiceDaysList" default="1 2 3 4 5 6 7"/>
  <attribute name="recurrence" type="positiveInteger" default="1"/>
  <attribute name="startTime" type="dvbisd:ZuluTimeType" default="00:00:00Z"/>
</complexType>
```
Table 26: ServiceAvailabilityType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td></td>
<td>Mandatory</td>
</tr>
<tr>
<td>@validFrom</td>
<td>The time and date that this service will become or became available. If not specified, it is assumed that the service is already available.</td>
<td>Optional</td>
</tr>
<tr>
<td>@validTo</td>
<td>The time and date that this service will cease to be available. If not specified, it is assumed that the service will be available indefinitely.</td>
<td>Optional</td>
</tr>
<tr>
<td>Interval</td>
<td></td>
<td>Optional</td>
</tr>
<tr>
<td>@days</td>
<td>Defines which days in a calendar week the service is available. If not specified then the service is available on all days. For example @days=&quot;1 4 7&quot; means that the service is only available on Monday, Thursday and Sunday.</td>
<td>Optional</td>
</tr>
<tr>
<td>@recurrence</td>
<td>Specifies the weekly cadence of the scheduled availability for the service. If not specified then the recurrence occurs every week.</td>
<td>Optional</td>
</tr>
<tr>
<td>@startTime</td>
<td>The time of day that the service becomes available. If not specified the service starts at midnight at the start of the day.</td>
<td>Optional</td>
</tr>
<tr>
<td>@endTime</td>
<td>The time of day that the service ceases to be available. If this value is less than or equal to the value of @startTime the service ends on the following day. If not specified the service ends at midnight of the present day.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.5.16 ServiceDaysList

```
<simpleType name="ServiceDaysList">
    <list>
        <restriction base="integer">
            <minInclusive value="1"/>
            <annotation><documentation xml:lang="en">Monday</documentation></annotation>
            <maxInclusive value="7"/>
            <annotation><documentation xml:lang="en">Sunday</documentation></annotation>
        </restriction>
    </list>
</simpleType>
```

5.5.17 ZuluTimeType

This datatype restricts the XML time type, permitting only Zulu time to be specified. Zulu time, denoted by "Z" is equivalent to UTC (see clause 3.2.8.2 of W3C XML Schema Part 2: Datatypes [i.6]).

```
<simpleType name="ZuluTimeType">
    <restriction base="time">
        <pattern value="((\[01]\d|2[0-3]):[0-5]\d:[0-5]\d(\.|\d+)?)Z"/>
    </restriction>
</simpleType>
```
5.5.18 Delivery Parameters

5.5.18.1 DVBTDeliveryParametersType

```xml
<complexType name="DVBTDeliveryParametersType">
  <sequence>
    <element name="DVBTriplet" type="dvbisd:DVBTripletType" />  
    <element name="TargetCountry" type="tva:ISO-3166-Code" minOccurs="0" />  
  </sequence>
</complexType>
```

Table 27: DVBTDeliveryParametersType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td>The DVB triplet that can be used to refer to this service. <code>@tsId</code> or <code>@origNetId</code></td>
<td>Mandatory</td>
</tr>
<tr>
<td></td>
<td>may be omitted to indicate a wildcard. Service instance matching may not be valid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if both <code>@tsId</code> and <code>@origNetId</code> are omitted.</td>
<td></td>
</tr>
<tr>
<td>TargetCountry</td>
<td>The country where the broadcast service is delivered.</td>
<td>Deprecated!</td>
</tr>
<tr>
<td></td>
<td>The use of this element is deprecated as receivers depend on the ONID to determine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the provenance of a terrestrial broadcast signal, in the absence of other (out of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>band) information.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.5.18.2 DVBSDeliveryParametersType

```xml
<complexType name="DVBSDeliveryParametersType">
  <sequence>
    <element name="DVBTriplet" type="dvbisd:DVBTripletType" />  
    <element name="OrbitalPosition" type="dvbi-types:LongitudeType" minOccurs="0" />  
    <sequence minOccurs="0">
      <element name="Frequency" type="positiveInteger" />  
      <element name="Polarization" type="string">  
        <restriction base="string">  
          <enumeration value="horizontal"/>  
          <enumeration value="vertical"/>  
          <enumeration value="left circular"/>  
          <enumeration value="right circular"/>  
        </restriction>
      </element>
      <element name="SymbolRate" type="positiveInteger" minOccurs="0" />  
      <element name="RollOff" type="string">  
        <restriction base="string">  
          <enumeration value="0.35"/>  
          <enumeration value="0.25"/>  
          <enumeration value="0.20"/>  
          <enumeration value="0.15"/>  
          <enumeration value="0.10"/>  
          <enumeration value="0.05"/>  
        </restriction>
      </element>
    </sequence>
  </sequence>
</complexType>
```
<element name="ModulationSystem">
  <simpleType>
    <restriction base="string">
      <enumeration value="DVB-S"/>
      <enumeration value="DVB-S2"/>
      <enumeration value="DVB-S2X"/>
    </restriction>
  </simpleType>
</element>

<element name="ModulationType">
  <simpleType>
    <restriction base="string">
      <enumeration value="QPSK"/>
      <enumeration value="8PSK"/>
      <enumeration value="8PSK-L"/>
      <enumeration value="16APSK"/>
      <enumeration value="16APSK-L"/>
      <enumeration value="32APSK"/>
      <enumeration value="32APSK-L"/>
      <enumeration value="64APSK"/>
      <enumeration value="64APSK-L"/>
    </restriction>
  </simpleType>
</element>

<element name="FEC">
  <simpleType>
    <restriction base="string">
      <enumeration value="1/2"/>
      <enumeration value="2/3"/>
      <enumeration value="3/4"/>
      <enumeration value="5/6"/>
      <enumeration value="7/8"/>
      <enumeration value="8/9"/>
      <enumeration value="3/5"/>
      <enumeration value="4/5"/>
      <enumeration value="9/10"/>
      <enumeration value="1/4"/>
      <enumeration value="1/3"/>
      <enumeration value="2/5"/>
      <enumeration value="13/45"/>
      <enumeration value="9/20"/>
      <enumeration value="11/20"/>
      <enumeration value="23/36"/>
      <enumeration value="25/36"/>
      <enumeration value="13/18"/>
      <enumeration value="5/9"/>
      <enumeration value="26/45"/>
      <enumeration value="28/45"/>
      <enumeration value="7/9"/>
      <enumeration value="77/90"/>
      <enumeration value="8/15"/>
      <enumeration value="32/45"/>
      <enumeration value="11/15"/>
    </restriction>
  </simpleType>
</element>
</sequence>
Table 28: DVBSDeliveryParametersType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td>The DVB triplet that can be used to refer to this service. @tsId or @origNetId may be omitted to indicate a wildcard. Service instance matching may not be valid if both @tsId and @origNetId are omitted.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>OrbitalPosition</td>
<td>The orbital position expressed in positive or negative degrees representing east and west directions respectively.</td>
<td>Optional {0..1}</td>
</tr>
<tr>
<td>Frequency</td>
<td>The carrier frequency expressed in units of 10 kHz. This unit size is also used in the frequency provided in the satellite delivery system descriptor, clause 6.2.13.2 of ETSI EN 300 468 [6].</td>
<td>Optional {0..1}</td>
</tr>
<tr>
<td>Polarization</td>
<td>The polarization of the transmitted signal.</td>
<td></td>
</tr>
<tr>
<td>SymbolRate</td>
<td>The symbol rate in kSymbol/s.</td>
<td>Optional {0..1}</td>
</tr>
<tr>
<td>RollOff</td>
<td>Specifies the roll-off factor. For DVB-S this value shall be set to &quot;0.35&quot;. For DVB-S2 this value shall be set to &quot;0.35&quot;, &quot;0.25&quot; or &quot;0.20&quot;. For DVB-S2X, this value shall be set to &quot;0.35&quot;, &quot;0.25&quot;, &quot;0.20&quot;, &quot;0.15&quot;, &quot;0.10&quot; or &quot;0.05&quot;.</td>
<td>Optional {0..1}</td>
</tr>
<tr>
<td>ModulationSystem</td>
<td>Specifies the broadcast scheme used: DVB-S, DVB-S2 or DVB-S2X.</td>
<td></td>
</tr>
<tr>
<td>ModulationType</td>
<td>Specifies the modulation scheme used. For DVB-S this value shall be set to &quot;QPSK&quot;. For DVB-S2 this value shall be set to &quot;QPSK&quot; or &quot;8PSK&quot;.</td>
<td></td>
</tr>
</tbody>
</table>
5.5.18.3 DVBCDeliveryParametersType

```xml
<complexType name="DVBCDeliveryParametersType">
  <sequence>
    <element name="DVBTriplet" type="dvbisd:DVBTripletType"/>
    <element name="TargetCountry" type="tva:ISO-3166-Code" minOccurs="0"/>
    <element name="NetworkID" type="dvbi-types:NetworkIdType"/>
  </sequence>
</complexType>
```

Table 29: DVBCDeliveryParametersType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td>The DVB triplet that can be used to refer to this service. @tsId or @origNetId may be omitted to indicate a wildcard. Service instance matching may not be valid if both @tsId and @origNetId are omitted.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>TargetCountry</td>
<td>The country identifier where the broadcast service is delivered. The use of this element is deprecated as receivers depend on the Network ID to determine the provenance of a cable broadcast signal, in the absence of other (out of band) information.</td>
<td>Deprecated! Optional</td>
</tr>
<tr>
<td>NetworkID</td>
<td>Identifies the terrestrial network that supports the service.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

5.5.18.4 RTSPDeliveryParametersType

```xml
<complexType name="RTSPDeliveryParametersType">
  <sequence>
    <element name="DVBTriplet" type="dvbisd:DVBTripletType"/>
    <element name="RTSPURL" type="dvbisd:RTSPURLType"/>
    <element name="MinimumBitRate" type="unsignedInt" minOccurs="0"/>
  </sequence>
</complexType>
```

Table 30: RTSPDeliveryParametersType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td>The DVB triplet that can be used to refer to this service. @tsId or @origNetId may be omitted to indicate a wildcard. Service instance matching may not be valid if both @tsId and @origNetId are omitted.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
### 5.5.18.5 MulticastTSDeliveryParametersType

```xml
<complexType name="MulticastTSDeliveryParametersType">
  <sequence>
    <element name="DVBTriplet" type="dvbisd:DVBTripletType" minOccurs="0"/>
    <element name="IPMulticastAddress" type="dvbisd:McastType"/>
    <element name="MinimumBitRate" type="unsignedInt" minOccurs="0"/>
  </sequence>
</complexType>
```

**Table 31: MulticastTSDeliveryParametersType Fields**

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td>The DVB triplet that can be used to refer to this service. @tsId or @origNetId may be omitted to indicate a wildcard. Service instance matching may not be valid if both @tsId and @origNetId are omitted.</td>
<td>Optional</td>
</tr>
<tr>
<td>IPMulticastAddress</td>
<td>Signals the use of IGMP to access the service and provides the transport address and other parameters at which the service may be accessed.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>MinimumBitRate</td>
<td>Threshold bit-rate under which an alternative source for the same service should be preferred, if available.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

### 5.5.18.6 DASHDeliveryParametersType

```xml
<complexType name="DASHDeliveryParametersType">
  <sequence>
    <element name="UriBasedLocation" type="dvbi-types:ExtendedURIType"/>
    <element name="MinimumBitRate" type="unsignedInt" minOccurs="0"/>  
    <element name="Extension" type="dvbi-types:ExtensionBaseType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
</complexType>
```

**Table 32: DASHDeliveryParametersType Fields**

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>UriBasedLocation</td>
<td>Provides the URI where the service is located, where the target of the URI has the MIME type as provided in the @contentType attribute.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>MinimumBitRate</td>
<td>Threshold bit-rate under which an alternative source for the same service should be preferred, if available.</td>
<td>Optional 0 .. 1</td>
</tr>
<tr>
<td>Extension</td>
<td>Elements and attributes that are defined by 3rd parties applicable to broadband content delivery using DVB-DASH.</td>
<td>Optional 0 .. ∞</td>
</tr>
</tbody>
</table>

### 5.5.18.7 SATIPDeliveryParametersType

```xml
<complexType name="SATIPDeliveryParametersType">
  <sequence>
  </sequence>
</complexType>
```
Table 33: SATIPDeliveryParametersType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>QueryParameters</td>
<td>Contains a list of query parameters formatted for SAT&gt;IP according to clauses 3.5.10 and 3.5.11 for DVB-S/S2 and annexes C and D for DVB-C and T/T2 of EN 50585 [10] except the &quot;src&quot; query parameter. The SAT&gt;IP client is responsible for determining the local address of an appropriate SAT&gt;IP server and for determining the correct &quot;src&quot; parameter, based on information from the corresponding DVBSDeliveryParameters element. A DVB-I client shall not choose a SAT&gt;IP delivered service instance in preference to other available service instances unless either: a) it can verify, using local configuration or other means, that the SAT&gt;IP server is receiving broadcasts from the orbital position described in the DVBSDeliveryParameters.OrbitalPosition element; or b) it is able to perform the service instance matching rules defined in clause 5.2.1.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

5.5.18.8 IdentifierBasedDeliveryParametersType

<complexType name="IdentifierBasedDeliveryParametersType">
  <simpleContent>
    <extension base="anyURI">
      <attribute name="contentType" type="mpeg7:mimeType"/>
    </extension>
  </simpleContent>
</complexType>

Table 33a: IdentifierBasedDeliveryParametersType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@contentType</td>
<td>Identifies the payload type of the delivery parameters specified in the element value, for example through the use of a well-known URI scheme name that has been previously registered per IETF BCP 35 [38]. When not present, it is assumed that the payload type can be determined through some component of the element value, possibly through registration in naming system.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.5.19 FTAContentManagementType

<complexType name="FTAContentManagementType">
  <attribute name="userDefined" type="boolean" use="required"/>
  <attribute name="doNotScramble" type="boolean" use="required"/>
  <attribute name="controlRemoteAccessOverInternet" use="required"/>
  <simpleType>
    <restriction base="unsignedByte">
      <minInclusive value="0"/>
      <maxInclusive value="3"/>
    </restriction>
  </simpleType>
</complexType>
Table 34: FTAContentManagementType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@userDefined</td>
<td>The semantics of each attribute are those defined for the correspondingly named fields of the FTA_content_management_descriptor defined in clause 6.2.18.0 of ETSI EN 300 468 [6].</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@doNotScramble</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>@controlRemoteAccessOverInternet</td>
<td>Mandatory</td>
<td></td>
</tr>
<tr>
<td>@doNotApplyRevocation</td>
<td>Mandatory</td>
<td></td>
</tr>
</tbody>
</table>

5.5.20 ContentProtectionType

```xml
<complexType name="ContentProtectionType">
  <sequence>
    <element name="CASystemId" type="dvbisd:CASystemType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="DRMSystemId" type="dvbisd:DRMSystemType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
</complexType>
```
Table 35: ContentProtectionType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASystemId</td>
<td>Denotes the Conditional Access system(s) being used for this service instance. The value(s) shall consist of CA System ID(s) as defined in clause 5.2 of ETSI TS 101 162 [11].</td>
<td>Optional</td>
</tr>
<tr>
<td>@cpsIndex</td>
<td>The index of the content protection scheme, unique for a service, across all service instances. Enables a specific content protection scheme to be referenced within the content guide metadata. For instance, a service may only use content protection for specific events.</td>
<td>Optional</td>
</tr>
<tr>
<td>DRMSystemId</td>
<td>Denotes the content protection scheme(s) being used for this service instance. The value(s) shall consist of DRM System ID values as described in clause 8.2 of ETSI TS 103 285 [1].</td>
<td>Optional</td>
</tr>
<tr>
<td>@encryptionScheme</td>
<td>Indicates the encryption scheme, as defined for @value in clause 8.4 of ETSI TS 103 285 [1]. For interoperability with client devices that only support a specific pattern of encrypted/unencrypted bytes such as that described in clause 4.5.2 of CTA-5001-B [i.12], the additional 'cbcs-10' value can be used to identify AES-128 CBC with a 1:9 encrypt:skip pattern (10 % partial encryption) as recommended in clause 10.4.2 of ISO/IEC 23001-7:2016 [23].</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@cpsIndex</td>
<td>The index of the content protection scheme, unique for a service, across all service instances. Enables a specific content protection scheme to be referenced within the content guide metadata. For instance, a service may only use content protection for specific events.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

NOTE 1: Registered CA System ID values can be found here: https://www.dvbservices.com/identifiers/ca_system_id.
NOTE 2: Registered DRM System ID values can be found here: https://dashif.org/identifiers/content_protection/.

NOTE: The present document does not define a dedicated mechanism for delivering licenses to content protection systems. This may be done using a linked application, see clause 5.1.6.

5.5.21 void

void.

5.5.22 void

void.

Table 36: void

5.5.23 ExtensionBaseType

NOTE: This datatype is defined in the servicediscovery-types schema, see annex A.3.

```xml
<complexType name="ExtensionBaseType" abstract="true">
    <attribute name="extensionName" use="required">
        <simpleType>
            <restriction base="string">
                <pattern value="[A-Za-z0-9][A-Za-z0-9:/.\-]*[A-Za-z0-9]"/>
            </restriction>
        </simpleType>
    </attribute>
</complexType>
```
Table 37: ExtensionBaseType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@extensionName</td>
<td>Identifies the definition for the extension. Specifications or organizations defining extensions to the present document should take care to use this attribute in a way that provides both identification and uniqueness.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

5.5.24 VideoAttributesType

```xml
<complexType name="VideoAttributesType">
  <complexContent>
    <extension base="tva:VideoAttributesType">
      <sequence>
        <element name="Colorimetry" type="tva:ControlledTermType" minOccurs="0"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>
```

Table 37a: VideoAttributesType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorimetry</td>
<td>The colorimetric parameters of the video image. This term should be taken from the ColorimetryCS classification scheme defined in clause D.6. When this element is absent the colorimetry of the video can be assumed to be &quot;BT.709&quot;.</td>
<td>Optional 0 .. 1</td>
</tr>
</tbody>
</table>

5.5.25 SubscriptionPackageListType

```xml
<complexType name="SubscriptionPackageListType">
  <sequence>
    <element name="SubscriptionPackage" type="dvbisd:SubscriptionPackageType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
  <attribute name="allowNoPackage" type="boolean" default="true"/>
</complexType>
```

Table 37b: SubscriptionPackageListType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>SubscriptionPackage</td>
<td>Identifies a subscription package (see clause 5.1.5) that applies to one or more LCN tables in the service list (see clause 5.5.12) and/or to one or more service instances in the service list (see clause 5.5.4).</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>@allowNoPackage</td>
<td>Specifies whether one of the subscription packages from the list must be selected to install the service list or not. When set to true, it shall be possible to select none of the subscription packages in the list when installing the service list.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.5.26 NVODType

```xml
<complexType name="NVODType">
  <attribute name="mode" use="required">
    <simpleType>
      <restriction base="string">
        <enumeration value="reference"/>
        <enumeration value="timeshifted"/>
      </restriction>
    </simpleType>
  </attribute>
</complexType>
```
Table 37c: NVODType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@mode</td>
<td>Identifies the service as being either an NVOD reference service or an NVOD timeshifted service.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@reference</td>
<td>Applies only when @mode=&quot;timeshifted&quot;. The unique identifier of the reference service in the service list that this service is</td>
<td>Optional</td>
</tr>
<tr>
<td>@offset</td>
<td>Applies only when @mode=&quot;timeshifted&quot;. Specifies the time difference of programs shown on the time-shifted service in relation to the reference service. If this attribute is omitted it should be interpreted as zero duration.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.5.27 Service Prominence

<complexType name="ServiceProminenceListType">
  <sequence>
    <element name="Prominence" type="dvbisd:ServiceProminenceEntryType" maxOccurs="unbounded"/>
  </sequence>
</complexType>

<complexType name="ServiceProminenceEntryType">
  <simpleContent>
    <extension base="string">
      <attribute name="country" type="tva:ISO-3166-Code"/>
      <attribute name="region" type="dvbisd:RegionidRefType"/>
      <attribute name="ranking">
        <simpleType>
          <restriction base="integer">
            <minInclusive value="1"/>
            <maxInclusive value="4095"/>
          </restriction>
        </simpleType>
      </attribute>
    </extension>
  </simpleContent>
</complexType>

Table 37d: ServiceProminenceListType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prominence</td>
<td>A list of prominence entries for the service.</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
Table 37e: ServiceProminenceEntryType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@country</td>
<td>The code for the country where this prominence entry applies.</td>
<td>Optional</td>
</tr>
<tr>
<td>@region</td>
<td>The region identifier (@regionID as defined in clause 5.6.2.1) for the region where this prominence entries applies.</td>
<td>Optional</td>
</tr>
<tr>
<td>@ranking</td>
<td>Indicates the relative prominence to be attributed to the service within the specified country or region. Lower values of this attribute indicate a higher priority. If this attribute is not provided, then the service can be considered as prominent, but its correlation with other prominent services is indeterminant.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.5.28 ParentalRatingType

```xml
<complexType name="ParentalRatingType">
  <sequence>
    <element name="MinimumAge" maxOccurs="unbounded">
      <complexType>
        <simpleContent>
          <extension base="nonNegativeInteger">
            <attribute name="countryCodes" type="tva:ISO-3166-List" use="optional"/>
          </extension>
        </simpleContent>
      </complexType>
    </element>
  </sequence>
</complexType>
```

Table 37f: ParentalRatingType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>MinimumAge</td>
<td>The minimum age required by the parental rating attributed to the service. Different ratings may be defined for different countries or groups of countries. For example, MinimumAge=7 means viewers should be at least 7 years old. A maximum of one MinimumAge shall be defined per country.</td>
<td>Mandatory 1 .. ∞</td>
</tr>
<tr>
<td>@countryCodes</td>
<td>Optionally the country or countries to which the associated minimum age rating applies may be defined, by specifying one or more ISO 3166 [i.8] country codes as a comma-separated list. When no country is defined, the minimum age rating shall apply irrespective of the country. Different minimum ages ratings may be defined for different countries.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

Signalling the parental rating at the service level can be a more efficient way of enforcing parental rating for services that consist predominantly or exclusively of programmes of a certain age rating, and for which no content guide metadata is available.

When selecting a service, the client shall enforce its current parental rating criteria using the Service.ParentalRating when it is defined for that service. Except when parental rating information provided by content guide metadata (see clause 6.10.15) is available, then the content guide metadata shall take precedence over Service.ParentalRating when selecting the service during the corresponding programme.

For example, with a client parental rating configured to restrict content for ages 16+, when selecting a service with Service.ParentalRating.MinimumAge = 12 applicable to the user’s country, the client shall permit access to the service.

However, when a programme on that service has a minimum age rating of 18+ as signalled via the content guide metadata, the client shall prohibit access to the service during that specific programme.
Conversely, with a client parental rating configured to restrict content for ages 16+, when selecting a service with `Service.ParentalRating.MinimumAge = 18` applicable to the user’s country, the client will prohibit access to the service.

However, when a programme on that service has a minimum age rating of 12+ as signalled via the content guide metadata, the client shall allow access to the service during that specific programme.

If `AdaptationSet.Rating` is signalled in any Adaptation Set in the manifest for a DVB-DASH delivered service instance, then `Service.ParentalRating` shall also be signalled for the parent service. If there is more than one Adaptation Set then the same parental rating schemes should be signalled in each such Adaptation Set.

Each parental rating scheme signalled in any `AdaptationSet.Rating` shall be signalled in `Service.ParentalRating`. For each parental rating scheme, the value signalled in `Service.ParentalRating` shall be the same as, or more restrictive than, the most restrictive value signalled for that parental rating scheme in any Adaptation Set in the manifest. As a consequence of this, a DVB-I client can ignore `AdaptationSet.Rating`.

**EXAMPLE:** There are two Adaptation Sets in the DVB-DASH manifest, one with age-based `AdaptationSet.Rating` of 12 and one with age-based `AdaptationSet.Rating` of 15. `Service.ParentalRating` signals an age-based rating of 15 (or greater).

### 5.5.29 LCNRangeType

```xml
<complexType name="LCNRangeType">
    <attribute name="start" type="positiveInteger" use="required"/>
    <attribute name="end" type="positiveInteger"/>
    <attribute name="priority" type="nonNegativeInteger" default="0"/>
    <attribute name="fillMethod" default="startFromHighest">
        <simpleType>
            <restriction base="string">
                <enumeration value="fillGaps"/>
                <enumeration value="startFromHighest"/>
            </restriction>
        </simpleType>
    </attribute>
    <attribute name="serviceOrigin" default="dvbi">
        <simpleType>
            <restriction base="string">
                <enumeration value="any"/>
                <enumeration value="dvbi"/>
                <enumeration value="targetBroadcast"/>
                <enumeration value="otherBroadcast"/>
            </restriction>
        </simpleType>
    </attribute>
    <attribute name="serviceType" type="mpeg7:termReferenceType"/>
    <attribute name="serviceGenre" type="mpeg7:termReferenceType"/>
</complexType>
```

**Table 37g: LCNRangeType Fields**

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>@start</td>
<td>The first channel number in the range to map to services without a channel number assigned by an <code>LCNTable.LCN</code> value.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@end</td>
<td>The last channel number in the range to map to services without a channel number assigned by an <code>LCNTable.LCN</code> value. The range shall be ascending when <code>@start &lt; @end</code>. The range shall be descending when <code>@end &lt; @start</code>.</td>
<td>Optional</td>
</tr>
<tr>
<td>Name</td>
<td>Semantic Definition</td>
<td>Constraints</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>@priority</td>
<td>The priority of this LCN range relative to any other LCN ranges defined. Lower values of this attribute indicate a higher priority. Higher priority LCN ranges shall be used first, until all their LCNs are assigned. When LCN ranges have the same priority, the range with the lowest @start value shall be used first.</td>
<td>Optional</td>
</tr>
<tr>
<td>@fillMethod</td>
<td>Determines how a client maps LCNs in the LCN range, when certain LCNs are already assigned by an LCNTable.LCN value:</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>• fillGaps indicates a client shall map any unassigned LCNs in the range, in order, starting from @start.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• startFromHighest indicates a client shall map any unassigned LCNs in ascending order, starting from the highest LCN already assigned in the range (see note 1).</td>
<td></td>
</tr>
<tr>
<td>@serviceOrigin</td>
<td>An LCNRange defines mapping rules for DVB-I services without a channel number assigned by an LCNTable.LCN value, non-DVB-I broadcast services or both.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>Non-DVB-I broadcast services are broadcast services discovered during the channel installation (RF scan), that are not referenced by the Service List (i.e. that do not match with any service instance).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-DVB-I broadcast services are either from a broadcast network targeted by the installation (e.g. national terrestrial services, services from an applicable bouquet or channel package), or from a broadcast network not targeted by the installation (e.g. foreign services discovered in a border region, services not part of an applicable bouquet or channel package).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This field determines which services to map channel numbers from this LCN range to, based on their origin:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• any indicates clients shall use the LCN range to map channel numbers to DVB-I services without an explicit LCN mapping, and should use the LCN range to map channel numbers to non-DVB-I broadcast services from a broadcast network targeted by the installation, and non-DVB-I broadcast services from a broadcast network not targeted by the installation, in that order of priority (see note 2).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• dvbi indicates clients shall use the LCN range to map channel numbers to DVB-I services without an explicit LCN mapping.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• targetBroadcast indicates clients should use the LCN range to map channel numbers to non-DVB-I broadcast services from a broadcast network targeted by the installation (see note 2).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• otherBroadcast indicates clients should use the LCN range to map channel numbers to non-DVB-I broadcast services from a broadcast network not targeted by the installation (see note 2).</td>
<td></td>
</tr>
<tr>
<td>@serviceType</td>
<td>LCNs from this LCN range shall only be mapped to services of this type, when this is specified (see ServiceType defined in Table 15).</td>
<td>Optional</td>
</tr>
<tr>
<td>@serviceGenre</td>
<td>LCNs from this LCN range shall only be mapped to services of this genre, when this is specified (see ServiceGenre defined in Table 15).</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**NOTE 1:** When using this fill method the range shall have @start < @end.

**NOTE 2:** When the LCNTable has @preserveBroadcastLCN set to true, only broadcast services without an LCN defined by the broadcast should be allocated an LCN in this range.

Clients should apply LCNRange mapping rules to DVB-I services in the order they are defined in the service list XML.
When service prominence is defined and applicable to the country and/or region the client is configured for (see clause 5.5.27), within an \texttt{LCNRange}, the client should map LCNs to DVB-I services without an LCN in order of their service prominence ranking, unless the client uses another convention than channel order for conveying prominence.

When all \texttt{LCN} and \texttt{LCNRange} defined in the applicable \texttt{LCNTable} have been applied, the client may choose the LCN mapping strategy to use for any remaining services.

Following service list updates and/or changes to the broadcast, services may no longer be present, new services may become available, or existing services may be subject to different LCN mapping rules:

- When new services with LCNs defined by an \texttt{LCNRange} become available and are added to a client’s channel installation, clients shall apply the \texttt{LCNRange} mapping rules to the new services.
- When services with LCNs defined by an \texttt{LCNRange} are assigned a specific LCN allocation by a new \texttt{LCNTable.LCN} value, that allocation shall be applied by clients.
- When services with an LCN allocation assigned by an \texttt{LCNTable.LCN} value have that allocation removed (i.e. the corresponding \texttt{LCNTable.LCN} is removed) and become subject to \texttt{LCNRange} mapping rules, clients shall apply the \texttt{LCNRange} mapping rules to those services.
- When services with LCNs defined by an \texttt{LCNRange} become subject to different \texttt{LCNRange} mapping rules, clients shall apply the newly applicable \texttt{LCNRange} mapping rules to the services (e.g. when a non-DVB-I broadcast service becomes a DVB-I service or vice versa and each have a dedicated \texttt{LCNRange}).
- When services with LCNs defined by an \texttt{LCNRange} are removed from a client’s channel installation, this can result in gaps in the channel numbering where channels were removed.

In all the abovementioned cases, clients should avoid re-applying \texttt{LCNRange} mapping rules to all channels, as that could result in changes to many different channel numbers, making it more difficult for users to find channels again after an update.

A client may offer the option to perform a full re-installation, during which the channel numbers of services with LCNs defined by an \texttt{LCNRange} would all be re-mapped, eliminating any gaps and potentially resulting in changes to the channel numbering due to the order in which services are processed by the client.

### 5.6 Service Regionalization

#### 5.6.1 General

DVB services are generally targeted at a specific region. There are multiple reasons for this, including the characteristics of the DVB delivery system used which limit the geographic area where the service may be received, the carriage of information tailored to a specific geographic region, content licensing restrictions or regulatory requirements, e.g. requirements relating to parental access control.

To meet these needs, DVB services described in a Service List can be associated with one or more target regions.

#### 5.6.2 RegionList

##### 5.6.2.1 General

When a DVB-I Service List contains Services that have target regions, a region list shall be provided together with the Service List. The region list contains a definition of every region that can be targeted by one or more DVB Services in the Service List. The Service List can then reference the regions defined in the region list using their unique \texttt{regionID}. The identifier for a region, as conveyed in the \texttt{@regionID} attribute, is defined by the Service List Provider and is unique within a single Service List.
Regions can be grouped hierarchically. At the top level, a region list shall contain one or more regions that represent different countries. Each of these regions representing countries, may contain zero, one or more primary sub-regions, each containing zero, one or more secondary sub-regions, that may each contain zero, one or more tertiary sub-regions. Therefore, a region list hierarchy shall consist of up to four levels in total, equivalent to the target region descriptor hierarchy (defined in clause 6.4.12 of ETSI EN 300 468 [6]):

- Region List
  - Region (Country) [1 .. n]
  - Primary sub-region [0 .. n]
  - Secondary sub-region [0 .. n]
    - Tertiary sub-region [0 .. n]

Top level regions may be used to represent geographical areas, for example Scandinavia, as well as individual countries. A country code may appear in more than one top level region.

Services may not be targeted at every region. Some regions may only be defined to structure the region list. When a region is only used to structure the region list, and no services or LCN tables are targeted at that region, then \@selectable=false shall be specified for the region. This enables clients to determine which regions can be selected for installing the service list, i.e. those with \@selectable=true. Regions at the lowest levels, i.e. regions that are leaves in the region list tree structure, shall always be selectable to prevent navigation in user interfaces leading to no selectable region.

When regions are used in combination with LCN tables, there shall be only one corresponding LCNTable for each unique TargetRegion when no SubscriptionPackage is used, or for each unique combination of TargetRegion and SubscriptionPackage when both TargetRegion and SubscriptionPackage are used.

Table 38 provides the semantic definition of RegionListType fields.

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>PostcodeType</td>
<td>A string containing one postcode, defined by the following pattern expressed in ABNF: Postcode = 1*(ALPHA / DIGIT) [ SP / &quot;+&quot; ] 1*(ALPHA / DIGIT) A postcode may be composed of alphanumeric characters (upper- and lower-case ASCII letters and decimal digits defined in ISO/IEC 646 [8]). A single whitespace (7-bit ASCII as defined in ISO/IEC 646 [8] code point 0x20) or hyphens (7-bit ASCII as defined in ISO/IEC 646 [8] code point 0x2D) may occur in the middle.</td>
<td></td>
</tr>
<tr>
<td>WildcardPostcodeType</td>
<td>A string containing part(s) of a postcode combined with one wildcard character, defined by the following pattern expressed in ABNF: WcPostcode = *** <em>(ALPHA / DIGIT) [ SP / &quot;+&quot; ] 1</em>(ALPHA / DIGIT) WcPostcode /= 1*(ALPHA / DIGIT) [ SP / &quot;+&quot; ] *** 1*(ALPHA / DIGIT) WcPostcode /= 1*(ALPHA / DIGIT) *** [ SP / &quot;+&quot; ] 1*(ALPHA / DIGIT) WcPostcode /= 1*(ALPHA / DIGIT) [ SP / &quot;+&quot; ] *(ALPHA / DIGIT) &quot;&quot; An asterisk character &quot;&quot; (7-bit ASCII as defined in ISO/IEC 646 [8] code point 0x2A) shall be used as a wildcard, that shall match with one or more alphanumeric characters. A wildcard character shall only be used once within a single wildcard postcode string.</td>
<td></td>
</tr>
<tr>
<td>PostcodeRangeType</td>
<td>A type used to define a range of postcodes. Postcode order shall follow ASCII-code as defined in ISO/IEC 646 [8] order.</td>
<td>@from Mandatory</td>
</tr>
<tr>
<td>@from</td>
<td>The postcode defining the start of the range.</td>
<td></td>
</tr>
<tr>
<td>@to</td>
<td>The postcode defining the end of the range.</td>
<td></td>
</tr>
<tr>
<td>LatitudeType</td>
<td>A type used to define the latitude of a set of coordinates, expressed in decimal degrees and defined as follows in ABNF: Latitude = 0<em>1([- / +]) lat-value lat-value = 0</em>1(1-8) DIGIT [ &quot;+&quot; 1<em>DIGIT] lat-value /= 90 [ &quot;+&quot; 1</em>0]]</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Semantic Definition</td>
<td>Constraints</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>LongitudeType</td>
<td>A type used to define the longitude of a set of coordinates, expressed in decimal degrees and defined as follows in ABNF: Longitude = 0<em>1(- / +) lng-value lng-value = 180 [&quot;.&quot; 1</em>0] lng-value =/[(1 (0-7) DIGIT) / ([1-9] DIGIT)] [&quot;.&quot; 1*DIGIT]</td>
<td></td>
</tr>
<tr>
<td>RadiusType</td>
<td>A type used to define the radius of a circular region, expressed in meters and defined as follows in ABNF: Radius = 1*DIGIT</td>
<td></td>
</tr>
<tr>
<td>CoordinatesType</td>
<td>A type used to provide the centre coordinates and radius of a circular geographical region. The geographic coordinate reference system used is the World Geodetic System [9].</td>
<td></td>
</tr>
<tr>
<td>Latitude</td>
<td>The latitude of the region.</td>
<td>Mandatory 1</td>
</tr>
<tr>
<td>Longitude</td>
<td>The longitude of the region.</td>
<td>Mandatory 1</td>
</tr>
<tr>
<td>Radius</td>
<td>The radius of the region.</td>
<td>Mandatory 1</td>
</tr>
<tr>
<td>CountryRegionType</td>
<td>A type used to provide the name and location of a region.</td>
<td></td>
</tr>
<tr>
<td>Region</td>
<td>The details of the primary sub-regions within the country.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>@regionID</td>
<td>A unique identifier used to identify the region within a Service List XML document.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@countryCodes</td>
<td>The list of countries that make up the region which may be further defined by the Region element. This attribute shall not be used for sub-regions.</td>
<td>Optional</td>
</tr>
<tr>
<td>PrimaryRegionType</td>
<td>A type used to provide the name and location of a primary region.</td>
<td></td>
</tr>
<tr>
<td>RegionName</td>
<td>The human-readable name of the primary region. Mandatory for a region targeted by one or more services and/or an LCN table, to enable selection of the region by the DVB-I client. Multiple elements of this type shall only be provided if they have different languages, indicated using the @xml:lang attribute. See note.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Region</td>
<td>The details of a secondary sub-region within the region.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Postcode</td>
<td>A postcode defining the geographical location of the primary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>WildcardPostcode</td>
<td>Postcodes defining the geographical location of the primary region. Defines a set of postcodes by including a wildcard character. May be provided to facilitate automatic region selection by the server or client or manual regional selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>PostcodeRange</td>
<td>A postcode range defining the geographical location of the primary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Coordinates</td>
<td>Coordinates and radius defining the geographical location of the primary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>@regionID</td>
<td>A unique identifier for a primary region within a Service List.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@selectable</td>
<td>Indicates whether the region is selectable in the UI for subsequent use in LCN tables, subscription packages and services. When not specified the region shall be selectable.</td>
<td>Optional</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Specifies the natural language when not explicitly provided in a multilingual element.</td>
<td>Optional</td>
</tr>
<tr>
<td>Name</td>
<td>Semantic Definition</td>
<td>Constraints</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>SecondaryRegionType</td>
<td>A type used to provide the name and location of a secondary region.</td>
<td></td>
</tr>
<tr>
<td>RegionName</td>
<td>The human-readable name of the secondary region. Mandatory for a region targeted by one or more services and/or an LCN table, to enable selection of the region by the DVB-I client. Multiple elements of this type shall only be provided if they have different languages, indicated using the @xml:lang attribute. See note.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Region</td>
<td>The details of a tertiary sub-region within the region. The use of sub-regions shall be limited to at most four levels in detail. Up to three levels of sub-regions may be defined below a top-level region (country); primary sub-regions, containing secondary sub-regions, containing tertiary sub-regions.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Postcode</td>
<td>A postcode defining the geographical location of the secondary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>WildcardPostcode</td>
<td>Postcodes defining the geographical location of the secondary region. Defines a set of postcodes by including a wildcard character. May be provided to facilitate automatic region selection by the server or client or manual regional selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>PostcodeRange</td>
<td>A postcode range defining the geographical location of the secondary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Coordinates</td>
<td>Coordinates and radius defining the geographical location of the secondary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>@regionID</td>
<td>A unique identifier for a secondary region within a Service List.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>@selectable</td>
<td>Indicates whether the region is selectable in the UI for subsequent use in LCN tables, subscription packages and services. When not specified the region shall be selectable.</td>
<td>Optional</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Specifies the natural language when not explicitly provided in a multilingual element.</td>
<td>Optional</td>
</tr>
<tr>
<td>TertiaryRegionType</td>
<td>A type used to provide the name and location of a tertiary region.</td>
<td></td>
</tr>
<tr>
<td>RegionName</td>
<td>The human-readable name of the tertiary region. Mandatory for a region targeted by one or more services and/or an LCN table, to enable selection of the region by the DVB-I client. Multiple elements of this type shall only be provided if they have different languages, indicated using the @xml:lang attribute. See note.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Postcode</td>
<td>A postcode defining the geographical location of the tertiary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>WildcardPostcode</td>
<td>Postcodes defining the geographical location of the tertiary region. Defines a set of postcodes by including a wildcard character. May be provided to facilitate automatic region selection by the server or client or manual regional selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>PostcodeRange</td>
<td>A postcode range defining the geographical location of the tertiary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
<tr>
<td>Coordinates</td>
<td>Coordinates and radius defining the geographical location of the tertiary region. May be provided to facilitate automatic region selection by the server or client or manual region selection by the client. Any service with which this region is associated shall be applicable to a client within this geographical location.</td>
<td>Optional 0 .. ∞</td>
</tr>
</tbody>
</table>
### RegionListType XML Schema

The XML schema for the RegionListType is defined as follows:

```xml
<simpleType name="PostcodeType">
  <restriction base="string">
    <pattern value="&Postcode;"/>
  </restriction>
</simpleType>

<simpleType name="WildcardPostcodeType">
  <restriction base="string">
    <pattern value="(&PostcodeWildFirst;)|(&PostcodeWildMiddle;)|(&PostcodeWildLast;)"/>
  </restriction>
</simpleType>
```
<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
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    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

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    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

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</complexType>

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</complexType>

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</complexType>

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    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

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    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
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<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
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<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
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<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
</complexType>

<complexType name="PostcodeRangeType">
    <attribute name="from" type="dvbisd:PostcodeRangeType" use="required"/>
    <attribute name="to" type="dvbisd:PostcodeRangeType" use="required"/>
<complexType name="PrimaryRegionType">
  <complexContent>
    <extension base="dvbisd:RegionBaseType">
      <sequence>
        <element name="Region" type="dvbisd:SecondaryRegionType" minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<complexType name="SecondaryRegionType">
  <complexContent>
    <extension base="dvbisd:RegionBaseType">
      <sequence>
        <element name="Region" type="dvbisd:TertiaryRegionType" minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<complexType name="TertiaryRegionType">
  <complexContent>
    <extension base="dvbisd:RegionBaseType"></extension>
  </complexContent>
</complexType>

<complexType name="RegionBaseType" abstract="true">
  <sequence>
    <element name="RegionName" type="mpeg7:TextualType" minOccurs="0" maxOccurs="unbounded"/>
    <choice minOccurs="0" maxOccurs="unbounded">
      <element name="Postcode" type="dvbisd:PostcodeType"/>
      <element name="WildcardPostcode" type="dvbisd:WildcardPostcodeType"/>
      <element name="PostcodeRange" type="dvbisd:PostcodeRangeType"/>
      <element name="Coordinates" type="dvbisd:CoordinatesType"/>
    </choice>
  </sequence>
  <attribute name="regionID" type="dvbisd:RegionIdType" use="required"/>
  <attribute name="selectable" type="boolean" default="true"/>
  <attribute ref="xml:lang"/>
</complexType>

5.6.2.3 Region List Examples

Combination of individual postcodes with wildcards and ranges

```
<RegionList version="1">
  <Region countryCodes="ITA" regionID="Italy-Ranges">
    <Region regionID="Piemonte">
      <RegionName>Piemonte</RegionName>
      <PostcodeRange from="15010" to="15122"/>
      <PostcodeRange from="14010" to="14100"/>
      <PostcodeRange from="13811" to="13900"/>
      <PostcodeRange from="12010" to="12025"/>
      <PostcodeRange from="10100" to="10156"/>
      <PostcodeRange from="28010" to="28100"/>
      <PostcodeRange from="28801" to="28925"/>
      <PostcodeRange from="13010" to="13100"/>
  </Region>
</RegionList>
```
Combination of individual postcodes with wildcards and ranges

```xml
<RegionList version="1">
  <Region regionID="R1" countryCodes="FRA">
    <Region regionID="R1.1">
      <RegionName>Mulhouse</RegionName>
      <PostcodeRange from="68100" to="68299"/>
      <Coordinates>
        <Latitude>47.75</Latitude>
        <Longitude>7.34</Longitude>
        <Radius>30000</Radius>
      </Coordinates>
    </Region>
    <Region regionID="R1.2">
      <RegionName>Bordeaux</RegionName>
      <PostcodeRange from="33000" to="33899"/>
      <Coordinates>
        <Latitude>44.84</Latitude>
        <Longitude>-0.58</Longitude>
        <Radius>30000</Radius>
      </Coordinates>
    </Region>
    <Region regionID="R1.3">
      <RegionName>Rennes</RegionName>
      <WildcardPostcode>350*</WildcardPostcode>
      <WildcardPostcode>352*</WildcardPostcode>
      <WildcardPostcode>357*</WildcardPostcode>
      <Coordinates>
        <Latitude>48.1147</Latitude>
        <Longitude>-1.6794</Longitude>
        <Radius>30000</Radius>
      </Coordinates>
    </Region>
    <Region regionID="R1.4">
      <RegionName>Perpignan</RegionName>
      <PostcodeRange from="66000" to="66199"/>
      <Coordinates>
        <Latitude>42.6986</Latitude>
        <Longitude>2.8956</Longitude>
        <Radius>30000</Radius>
      </Coordinates>
    </Region>
    <Region regionID="R1.5">
      <RegionName>Amiens</RegionName>
      <PostcodeRange from="80000" to="80099"/>
      <Coordinates>
        <Latitude>49.892</Latitude>
        <Longitude>2.299</Longitude>
        <Radius>30000</Radius>
      </Coordinates>
  </Region>
</RegionList>
```
5.6.3 Region Selection (informative)

5.6.3.1 General

The region list is used by the DVB-I client to identify the most relevant services for a viewer. It does not restrict the availability of services. If geographical restrictions are required, separate methods such as DRM or geo-IP restrictions can be used. Where such restrictions are used, the region list should describe a region within which the content can be expected to be available.

Selection of the appropriate region may be performed by the Service List Server, the client or a combination of both.

5.6.3.2 Server-side Region Selection

The DVB-I service list server may determine the region based on information known about the client requesting the service list. For example, based on the IP address the client is connecting from or any other information available, shared in accordance with privacy regulation. In such a case, the server may provide the client with a Service List adapted to the client's region. The client may not need to perform any additional region selection or only a narrow region selection.

The client may provide additional information to the server in order to allow the server to produce a regional service list tailored to the client (see clause 5.6.4).

5.6.3.3 Client-side Region Selection

A DVB-I client may use the region list provided in a Service List to enable selection of a region. This selection may be performed manually by the user or automatically by the DVB-I client.

Following region selection, the DVB-I client should use the selected region to filter the services in the service list or, if there are region specific LCN tables, select the respective LCN table. The DVB-I client should provide a channel list to the user following installation which includes services targeted at the selected regions, as well as services not targeted at any specific region. A DVB-I client may present additional channel lists to the user, which may include all services or may apply different filtering.

Region selection is expected to be performed during installation of services defined in a Service List, typically following country selection.

Regions with `@selectable=true` (the default value) can be selected to install the service list. When the user selects such a region, the client should enable the user to proceed with installation of the service list.

Regions with `@selectable=false` are only used for the purpose of organising regions hierarchically in the client’s user interface. Upon selection of such a region, a client should display the sub-regions below it, at the next level down in the region list hierarchy.

Regions with `@selectable=false` cannot be selected to install the service list as none of the services and/or LCN tables in the service list are targeted at such regions.

The DVB-I client may use a variety of methods to select a region including manual selection, matching against a known postcode location for the viewer, matching based on other position data, IP geolocation etc. The most appropriate method may depend on the type of device that is hosting the DVB-I client.
Manual region selection

When offering manual region selection, a DVB-I client should display the hierarchical list of regions available for the selected country, as defined in the region list. A DVB-I client should be able to display a hierarchy of regions in the region list consisting of up to 4 levels (e.g. top-level regions representing countries, containing primary sub-regions, containing secondary sub-regions, containing tertiary sub-regions). Regions to display to the user will have a region name that the DVB-I client should use to represent the region in its user interface. The DVB-I client should use region names corresponding to its current menu language when available.

Postcode entry

A DVB-I client may ask the user to enter their postcode. A DVB-I client can check for matches between the user entered postcode and the postcodes associated with regions in the region list. The region that matches with the user's postcode should automatically be selected by the DVB-I client. When there is more than one region matching the user's postcode, the DVB-I client should offer manual selection between those regions.

Geolocation (including IP geolocation)

A DVB-I client may use geolocation, with permission of the user, to determine the location of the DVB-I client and associated postcode. A DVB-I client can then compare the client location with coordinates provided for regions in the region list. If no coordinates are provided in the region list, a DVB-I client may also derive a postcode from the client location and check for matches with the postcodes associated with regions in the region list.

Client implementations should take into account that any automatically determined position may have a degree of uncertainty. To ensure that viewers located near the edge of a region are able to find services for that region, it is recommended that clients err on the side of reducing false negatives, accepting that this may result in some viewers outside the region being offered the service. When a client determines that there are multiple regions appropriate for the client's location, a client should offer manual selection between those regions. In the case of automatic region selection, clients should provide a means for an alternative region to be selected manually, in case geolocation failed to determine the correct location.

The following is an example of an installation sequence:

1) User selects their country.

2) User chooses to install services and selects the service (list) provider.

3) Client retrieves the service list.

4) Client determines the region to use from the region list by:
   a) showing the user a list of regions, enabling the user to select one; or
   b) asking the user to enter their postcode and matching that with a postcode (or postcode range) in the region list; or
   c) asking the user for permission to automatically detect their location then, if the user accepts, matching the geolocation result with location metadata in the region list.

5) Client offers the resulting channel list, containing regional services targeted at the user's region, as well as services not targeted at any specific region.

5.6.4 Server-side Region Selection using Client Provided Information

5.6.4.1 General

A Service List Server may optionally provide the facility to regionalise service lists before providing them to the client using geographic or other information. This results in an XML document containing a ServiceList element and
embedded RegionList and LCNList elements being tailored to the client (requiring no, or minimal, processing of the information client side).

The information the client may supply to the Service List Server are:

- **Postcode information** – a user entered country specific string of characters that denotes the user’s address.
- **Receivable multiplex information** – a list of ids acquired from broadcast (i.e. received SDT, NIT tables) including network_id, transport_stream_id and potentially original_network_id (see ETSI EN 300 468 [6]).
- **User selected regionID from a previously acquired ServiceList or by means outside the scope of the present document.**

If the Service List Server supports Server-side Region Selection it shall support the postcode method (see clause 5.6.4.2) or the regionID method (see clause 5.6.4.4) or both. Additionally, it may support the method based on receivable multiplex (see clause 5.6.4.3). If the Service List Server supports Server-side Region Selection it shall indicate the methods available by including the SRSSupport element in the ServiceListOffering.

A Service List Server shall provide a ServiceList element (and associated RegionList), as described in clause 5.5, if the client does not provide any of the above information.

### 5.6.4.2 Server-side Region Selection using Postcode Information

A DVB-I client may request a Service List using a user provided postcode.

**Request**

The request URL SHALL be composed as shown:

```
<ServiceList_URL>?postcode=<postcode>
```

where:

- **ServiceList_URL** is value of the ServiceListURI provided in the ServiceListOffering from the Service List Registry.
- **postcode** is a full or partial postcode. If a postcode of type WildcardPostcodeType is supplied the asterisk '*' must be encoded as %2A. Only a single wildcard character ('*') may be used.

**Response**

The SRS Service List Server returns a response in of 2 basic forms:

- **Default/Error Response**: Indicates an error in the request (see clause 5.6.4.5). The ServiceList returned will not be regionalised to the specific postcode.
- a DVB-I service list tailored for the specific region. Note that the ServiceList may contain multiple LCNTable elements which will require user selection.

### 5.6.4.3 Server-side Region Selection using reception information

#### 5.6.4.3.1 Introduction

A DVB-I client may request a Service List using a device’s receivable broadcast multiplexes.

Where a client is requesting multiplex information from multiple mediums (i.e. T/C/S) in order to request a combined service list all receivable multiplexes shall be included in the request (i.e. not just from a single medium).
5.6.4.3.2 SRS ServiceList Multiplex Info Endpoint

Request

In order to perform a service list request to a server supporting SRS the client requires information for every multiplex it can detect reliably during the process of scanning the RF frequency band:

- transport_stream_id and original_network_id (see clause 5.2.1 of ETSI EN 300 468 [6]) ideally derived from SDT actual, see note below, and
- network_id derived from NIT actual (see clause 5.2.1 of ETSI EN 300 468 [6]).

NOTE: for terrestrial services it is normal for the client to confirm it is able to receive the multiplex before installing services from that multiplex hence the use of SDT actual.

The request URL SHALL be composed of a ServiceList_URL and a multiplex list parameter:

<ServiceList_URL>?muxlist=<muxlist>

where:

- ServiceList_URL is value of the ServiceListURI provided in the ServiceListOffering from the Service List Registry.
- muxlist: an ordered list of the multiplexes the device can receive.

The <muxlist> parameter indicates a list receivable multiplexes available to the device in the following manner:

- If the device has an active tuner but no multiplexes are receivable, the <muxlist> parameter shall be absent; or
- The <muxlist> parameter shall consist of a list of receivable multiplexes

A list of multiplexes shall be presented in the following format:

<Mux1>_<Mux2>_<...>_<MuxN>

Where <Mux1> to <MuxN> are Multiplex Identifiers, indicating the multiplexes the device can receive in the order specified below. The Multiplex Identifiers are separated by the underscore character, '_'.

Each Multiplex Identifier is represented in one of two possible ways, either:

- Where only a single originalNetworkId is indicated in the ServiceListOffering: for multiplexes that are within the originalNetworkId listed in the ServiceListOffering, the Multiplex Identifier consists of the network id followed by transport stream id. Each is encoded as a 4-character hexadecimal lower-case zero-prefixed string and separated by a period, '. '. For example: 0abc.1044 represents network Id 2748, transport stream id 4164, original network id equal to the single originalNetworkId in the ServiceListOfferingType.

- Where multiple originalNetworkId values are indicated in the ServiceListOffering:
  - for multiplexes that are within one of the originalNetworkId listed in the ServiceListOffering, the Multiplex Identifier consists of the Network id followed by transport stream id, followed by the original network id. Each is encoded as a 4-character hexadecimal lower-case zero-prefixed string and separated by a period, '. '. For example: 0abc.1044.abcd represents network id 2748, transport stream id 4164, original network id 43981.

Response
The SRS Service List Server returns a response in of 2 basic forms:

- Default/Error Response: Indicates an error in the request (see clause 5.6.4.5). The ServiceList returned will not be tailored to the multiplexes received.
- A single ServiceList. Note that the ServiceList may contain multiple LCNTable elements which will require user selection.

5.6.4.4 Server-side Region Selection using region identifier

A DVB-I client may request a Service List using a regionID chosen by the user from a previous Service List (or by means outside the scope of the current document).

Request

The request URL shall be composed as shown:

<ServiceList_URL>?region=<regionID>

where:

- ServiceList_URL is value of the ServiceListURI provided in the ServiceListOffering from the Service List Registry.
- regionID is a regionID provided in the RegionList (see clause 5.6.2) from a previous Service List response or derived by other means outside the scope of the present document.

Response

The SRS Service List Server returns a response in of 2 basic forms:

- Default/Error Response: Indicates an error in the request (see clause 5.6.4.5). The Service List returned will not be regionalised to the specific postcode.
- A ServiceList tailored for the specific region.

5.6.4.5 SRS Response Status

A response from the SRS Service List Server shall indicate if the query was successfully processed by the server or otherwise. This is indicated in the @responseStatus attribute of the ServiceList element. Only Service List Servers supporting SRS will include a @responseStatus.

The @responseStatus attribute shall take one of the values in Table 38a.

<table>
<thead>
<tr>
<th>Status values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Response is complete, no errors were encountered.</td>
</tr>
<tr>
<td>ERROR_INVALID_MUX_INFO</td>
<td>Request did not correctly format the multiplex information. Invalid postcode provided. The returned ServiceList may not be tailored.</td>
</tr>
<tr>
<td>ERROR_INVALID_REQUEST</td>
<td>Request was not valid, or was formatted incorrectly.</td>
</tr>
<tr>
<td>ERROR_BUSY</td>
<td>Server was too busy to send a full response, retry later. Device should follow any Retry-After header, else use the back-off algorithm. The returned ServiceList should still be usable</td>
</tr>
<tr>
<td>ERROR_GENERIC_FAILURE</td>
<td>Any other error occurred.</td>
</tr>
<tr>
<td>ERROR_INVALID_POSTCODE</td>
<td>Invalid postcode provided. The returned ServiceList may not be tailored.</td>
</tr>
<tr>
<td>ERROR_INVALID_REGION_ID</td>
<td>Invalid regionID provided. The returned ServiceList may not be tailored.</td>
</tr>
</tbody>
</table>
5.7 Play Lists

5.7.1 Playlist

<element name="Playlist" type="dvbisd:DASHPlaylistType"/>
<complexType name="DASHPlaylistType">
  <sequence>
    <element name="PlaylistEntry" type="anyURI" maxOccurs="unbounded"/>
  </sequence>
</complexType>

Table 39: DASHPlaylistType Fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Semantic Definition</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playlist</td>
<td>A sequence of audio/video assets, statically or dynamically created by a Playlist Server when requested by the DVB-I client</td>
<td>Mandatory</td>
</tr>
<tr>
<td>PlaylistEntry</td>
<td>Reference to the URL of a DVB-DASH MPD manifest file that is part of the playlist</td>
<td>Mandatory 1..∞</td>
</tr>
</tbody>
</table>

6 Content Guide Metadata

6.1 Introduction

This clause describes the HTTP based API that a DVB-I client uses to acquire content guide metadata. A DVB-I client can operate as a hybrid client (broadcast DVB-C/S/T and IP) so this API may be used to enhance metadata received via a DVB-C/S/T broadcast network.

The metadata available via the API contains:

- the basic and enhanced linear schedule information (forwards 28 days)
- catch-up schedule information (backwards 28 days)
- metadata queries for more episodes in a search/series and content grouping into categories, series and brands allowing for "box set" user offerings
- deep links to IP streams and applications to play content
- channel and content images

The DVB-I metadata profile described here is based on the TV-Anytime schema and classification schemes. It also includes classification schemes bespoke to DVB-I. This profile is drawn from the Freeview Play specification [i.11].

Content guide sources can be discovered from either service lists or services. In descending order of precedence.

- A service may directly define a content guide source using the ContentGuideSource element
- A service list may define a set of content guide sources, in the ContentGuideSourceList element (see clause 5.5.6), each with an ID in the @CGSID attribute (see clause 5.5.7). Individual services within a service list reference one of the content guide sources in the set by providing an ID in their ContentGuideSourceRef element that matches a CGSID.
• A service list may define a single content guide source in the ContentGuideSource element (see clause 5.5.7).

6.2 Access and Query Language

6.2.1 Introduction

This clause describes the HTTP query mechanisms illustrated in figure 1 for interfaces A1, B1 and F1.

6.2.2 URL Format

The DVB-I client shall make requests against API resources, using URLs based on the following generic structure:

<api_endpoint_URL>/?<query_params>

The api_endpoint_URL is given by the ContentGuideSource element (see clause 5.5.7). Query parameters shall be used to apply filters to the result of a query. In some instances, there may be mandatory query parameters required. The details of each parameter shall be included in the relevant section of each API method. If an unprofiled query parameter is provided with a request to a DVB-I server endpoint a 400 (Bad Request) HTTP response may be returned.

All query parameters provided in requests to a Service List Server or Content Guide Server shall use the character set described in annex C of ETSI TS 102 809 [5]. Additionally, any "reserved" characters defined in clause 2.2 of IETF RFC 3986 [13] in the query string (within key/value pairs) shall be percent-encoded as defined in clause 2.1 of IETF RFC 3986 [13] before being submitted as a query parameter to the API. A space may either be percent encoded (i.e. "%20"), or as a plus sign, "+".

The maximum length of a fully qualified web service URL including parameters shall not exceed 2 048 characters. It shall not be necessary to construct URLs in excess of this length to access any of the services provided by a Service list server or Content Guide Server.

Where multiple values are accepted for a query parameter these shall be provided as repeated parameters with "square bracket" notation to indicate that they are array variables. For instance, when providing multiple service identifiers to in a request for scheduled programme metadata as in clause 6.5. The square brackets "[" and "]" within the URL enable efficient parsing by a Content Guide Server. The square brackets "[" and "]" shall be percent-encoded as defined in IETF RFC 1738 [12] and clause 2.1 of IETF RFC 3986 [13].

6.2.3 HTTP Request Headers

Refer to clause 4.3.24.3.2.

6.2.4 HTTP Responses

Refer to clause 4.3.3.

6.3 Regionalization

In order for a DVB-I server endpoint to perform server-side region tailoring of service and content guide information and only deliver the relevant data to a DVB-I client, it is possible to provide a means of regionalization on some of the API calls.

For schedule information, region is linked to the service identifier used in queries to a DVB-I server endpoint. The service identifier may be either a service's UniqueIdentifier or a ContentGuideServiceRef that may be either shared by multiple services, refer to another service or carry a value that is only applicable to the DVB-I server endpoint.
By providing a UniqueIdentifier for each service in a schedule information request, a client enables a DVB-I server endpoint to uniquely identify the services, including region-specific services, as regionalization is linked to a service's definition (see clause 5.6).

When multiple services share the same schedule information, e.g. regional variants of the same service, a ContentGuideServiceRef may be defined for those services in the service list. When defined, a client will use this instead of a service's UniqueIdentifier when requesting schedule information, enabling a DVB-I server endpoint to provide the same schedule information for those services.

6.4 Endpoint Queries

6.4.1 Introduction

This clause describes the various requests a DVB-I client can make in order to populate its UI. The data returned from the API endpoints is based on the TV-Anytime specification, ETSI TS 102 822-3-1 [7], please see clause 6.10 for further details.

6.4.2 ContentGuideSource Example

```
<ContentGuideSourceList>
  <ContentGuideSource CGSID="cgs-dvbi-01">
    <Name xml:lang="en">A-Z Content Guide</Name>
    <ProviderName xml:lang="en">A-Z Metadata</ProviderName>
    <RelatedMaterial>
      <tva:MediaLocator contentLanguage="en">
        <tva:MediaUri contentType="image/png">
          https://cgs.az.metadata/static/logo.png
        </tva:MediaUri>
      </tva:MediaLocator>
      <tva:MediaLocator contentLanguage="fr">
        <tva:MediaUri contentType="image/png">
          https://cgs.az.metadata/static/logo_fr.png
        </tva:MediaUri>
      </tva:MediaLocator>
    </RelatedMaterial>
    <ScheduleInfoEndpoint contentType="application/xml">
      <URI>https://cgs.az.metadata/schedule</URI>
    </ScheduleInfoEndpoint>
    <ProgramInfoEndpoint contentType="application/xml">
      <URI>https://cgs.az.metadata/program</URI>
    </ProgramInfoEndpoint>
    <GroupInfoEndpoint contentType="application/xml">
      <URI>https://cgs.az.metadata/group</URI>
    </GroupInfoEndpoint>
  </ContentGuideSource>
</ContentGuideSourceList>
```

6.4.3 Language Information

TV-Anytime requires that the default language used in a TV-Anytime document is specified with the TVAMain element using the @xml:lang attribute. The normal rules for scoping @xml:lang, and cascading to subelements applies. A TV-Anytime, ETSI TS 102 822-3-1 [7], document may contain text fields in multiple languages. The cardinality of any text element (e.g. Title) given in this metadata profile only refers to a single language. For example, multiple
Title elements may exist within ProgramInformation.BasicDescription each with @type of main but with different @xml:lang values.

6.5 Schedule Information Requests

6.5.1 Introduction

The ScheduleInfoEndpoint endpoint returns combined schedule, programme and on-demand programme information for a single service identified by a Service ID.

The API endpoints allow some flexibility in the time spans for which data is requested.

NOTE: There are some restrictions on time-periods in order to maintain the efficiency of a Content Guide Server.

The format of the response shall be the same for all schedule queries and is defined in clause 6.5.4.

As stated in clause 4.3.2.1, the expiry time contained in the Cache-Control: max-age header in returned schedule results shall be respected, however, the DVB-I client should not wait indefinitely before attempting to refresh the schedule.

6.5.2 Timestamp Filtered Schedule Request

6.5.2.1 Introduction

This provides schedule information between specified timestamps (multiples of 10 800 seconds) for a single service based on a Service ID.

In order to populate the backwards and forwards EPG for a service the request for a schedule between two specific timestamps can be constructed as follows. The DVB-I client shall request the schedule for specific services using the URL format below.

In all cases the following limitation shall apply:

- start_unixtime:
  - shall identify one of the following times of day (0:00, 3:00, 6:00, 9:00, 12:00, 15:00, 18:00, 21:00) i.e. the Unix timestamp shall be a whole multiple of 10 800
  - shall not be less than the Unix time of midnight at the start of the current day minus 28 full days (672 hours), represented as Unix time

- end_unixtime:
  - shall identify one of the following times of day (0:00, 3:00, 6:00, 9:00, 12:00, 15:00, 18:00, 21:00) i.e. the Unix timestamp shall be a whole multiple of 10 800
  - shall be greater than start_unixtime, by a value of either 21 600 seconds (6 hours) or 43 200 seconds (12 hours).
  - shall not be greater than the Unix time of midnight at the end of the present day plus 28 full days (672 hours), represented as Unix time.

In the case that a request is received using a start or end Unix time that does not match the format and restrictions defined above, a Content Guide Server shall return a 400 (Bad Request) HTTP response status. Likewise, if a request does not contain either a start or end Unix time, or if the value of either of these parameters is not a valid timestamp then a 400 (Bad Request) HTTP response shall be returned by a Content Guide Server. The DVB-I client shall not retry the same request without modifying the request parameters to meet the requirements above.
The returned document shall only contain ScheduleEvent elements with:

- PublishedStartTime equal to or greater than start_unixtime
- PublishedStartTime prior to end_unixtime

NOTE: The end time (PublishedStartTime + Duration) of the final ScheduleEvent is likely to be later than end_unixtime. The first ScheduleEvent within a schedule segment may have a PublishedStartTime some period after the start_unixtime defined in the request. The previous ScheduleEvent which spans start_unixtime can be retrieved by querying earlier schedule periods. The actual period covered by a Schedule element may be determined using the Schedule@start and Schedule@end attributes.

When including the optional parameter inclusive=true in the request URL, if supported by the Content Guide Server, the returned document shall only contain ScheduleEvent elements with PublishedStartTime prior to end_unixtime and end time (PublishedStartTime + Duration) greater than start_unixtime.

NOTE: The start time (PublishedStartTime) of the first ScheduleEvent may be earlier than start_unixtime, if any part of a program occurs in the requested interval, it shall be provided as a ScheduleEvent element in the response. The end time (PublishedStartTime + Duration) of the final ScheduleEvent may be later than end_unixtime. The actual period covered by a Schedule element is determined using the Schedule@start and Schedule@end attributes.

By comparing the Schedule@start value with the requested start time, the DVB-I client can determine if the Content Guide Server has returned the schedule events using the inclusive method.

6.5.2.2 Request Schedule by Service ID

This request shall include a service ID. Combining the results of multiple calls is the responsibility of the DVB-I client. A DVB-I client shall only request information for services that are listed in a DVB-I provided service list.

URL format:

<ScheduleInfoEndpoint>?start=<start_unixtime>&end=<end_unixtime>&sid=<service_id>&image_variant=<variant>&inclusive=<inclusive>

where:

- start_unixtime: the start time for the range of scheduled programmes.
- end_unixtime: the end time for the range of scheduled programmes.
- service_id: shall be a single service identifier as derived from the service list information. Either the UniqueIdentifier or the ContentGuideServiceRef of the service. ContentGuideServiceRef, when specified, takes precedence over UniqueIdentifier:
  - only a single occurrence of the sid parameter shall be passed.
- variant: (Optional) shall specify an image variant (see clause 5.2.8.2.1) for the image URLs provided in the response.
- inclusive: (Optional) by default false, the value true denotes that events starting before start_unixtime (and ending after start_unixtime) should be included in the response, if supported by the Content Guide Server.

Assuming that the Service ID provided is known to a Content Guide Server, the response shall be a 200 (OK) HTTP response with content as defined in clauses 6.5.4 and 6.10.

If the requested Service ID is not known to a Content Guide Server then a 200 (OK) HTTP response shall still be returned but the ProgramInformationTable and ProgramLocationTable shall not contain any elements.
Example URL:

<ScheduleInfoEndpoint>?start=1433246400&end=1433268000&sid=12345

Request for the schedule of programmes on 2 June 2015 between 12:00pm (noon) and 6:00pm for the service with either a UniqueIdentifier or ContentGuideServiceRef of 12345

6.5.3 Now/Next Filtered Schedule Request

6.5.3.1 Introduction

This provides schedule information containing only now and adjacent events for a given service.

In addition to retrieving sections of the entire schedule as described in clause 6.5.2, it is also possible for a DVB-I client to retrieve schedule information only for the current event and events adjacent to it.

A DVB-I client wishing to retrieve only the current event and one future event shall query the schedules endpoint without start and end times but with the query parameter now_next=true.

A DVB-I client wishing to retrieve the current event and up to ten previous and ten future events shall query the schedules endpoint without start and end times but with the query parameter now_next=window.

URL format:

<ScheduleInfoEndpoint>?sid=<service_id>&now_next=<window_type>&image_variant=<variant>

where:

- service_id: shall be a single service identifier as derived from the service list information. Either the UniqueIdentifier or the ContentGuideServiceRef of the service. ContentGuideServiceRef, when specified, takes precedence over UniqueIdentifier:
  - only a single occurrence of the sid parameter shall be passed.

- window_type: denotes the set of events provided in addition to the current event; true denotes only the current event and next scheduled event are requested, window denotes that up to 10 previous events and 10 future events can be provided with the current event.

- variant: (Optional) shall specify an image variant (see clause 5.2.8.2.1) for the image URLs provided in the response.

NOTE: In previous versions of this specification the &now_next query parameter in the URL format above was incorrectly specified as &nownext.

NOTE: For hybrid devices, EIT p/f from DVB-C/S/T is usually the primary source of metadata for the forwards EPG and the DVB-I client should determine the present and following events from EIT p/f and match them against the now/next events returned by a Content Guide Server

Example URL:

<ScheduleInfoEndpoint>?sid=12345&now_next=true

6.5.3.2 Polling of Now/Next Filtered Schedule Request end-point

If the ContentGuideSource includes a value for @minimumMetadataUpdatePeriod and the Service is indicated as dynamic (@dynamic=true) then the client may poll the Now/Next Filtered Schedule Request end-point in order to get accurate Now/Next metadata. This may be used to control the recording of IP delivered services (i.e. where EIT p/f is not available). It is expected that Now/Next channel banner use-case should not require polling and instead get the information on user initiation.
6.5.4 Response

6.5.4.1 Introduction

The schedule period included in the response will vary depending on the request, but the structure and following attributes of the response will be the same for all schedule requests.

A Content Guide Server shall return a well-formed XML document consisting of the following tables (see clause 6.10.1):

- ProgramLocationTable
- ProgramInformationTable
- GroupInformationTable (for responses to Now/Next and Window requests)

When the GroupInformationTable is provided in a response, the order of previous, present and future programs shall be determined by the structural CRIDs specified in the ProgramInformation.MemberOf elements within the ProgramInformationTable. If the GroupInformationTable is not provided, then the sequence of programs in time order can be determined by the PublishedStartTime of the ScheduleEvent elements.

The following attributes may be used to associate ProgramInformation elements, ScheduleEvent elements and OnDemandProgram elements within the schedule response:

- ProgramInformation@programId
- ScheduleEvent.Program@crid
- OnDemandProgram.Program@crid

CRIDs used to provide linkage between TV-Anytime XML fragments shall not be assumed to be consistent with any CRIDs provided in DVB-C/S/T broadcast Service Information (i.e. carried in the Content Identifier Descriptor as defined in ETSI TS 102 323 [28]).

If the CRID within an updated element has been changed to reference a new/different ProgramInformation element, it will be necessary to assess whether the prior ProgramInformation element is still referenced by other ScheduleEvent or OnDemandProgram elements. If not then it may be discarded.

All events in the returned ProgramLocation table shall have a matching entry in the returned ProgramInformation table. The ProgramInformation table shall only describe events present in the ProgramLocationTable.

If there are no matching schedule events for a requested service and the service is recognized by a Content Guide Server, then an empty Schedule element shall be returned for the service.

Where a ScheduleEvent in the ProgramLocation table is also available as an on-demand item then an OnDemandProgram element shall also be returned in the ProgramLocationTable.
6.5.4.2 Metadata Merging for Hybrid platforms

The Schedule@serviceIDRef attribute shall be used to associate the Schedule element with a specific service. It shall match UniqueIdentifier or ContentGuideServiceRef in the Service element (see clause 5.5.2). Content Guide Server metadata received for a selected broadcast service instance should be used in preference to DVB-SI EIT.

A hybrid DVB-I client shall perform service instance matching as defined in clause 5.2.1, thereby linking installed DVB-T/C/S services with Service List entries. While the ScheduleEvent.ProgramURL element may be used to associate ScheduleEvent items with broadcast SI scheduled events, in the form of a DVB Event Locator as defined in clause 6.4 of ETSI TS 102 851 [16], a hybrid client has already associated the service identifier from the Service List with the corresponding broadcast service. Consequently, such a client is not required to perform additional verification that the Original Network ID and Service ID are matched between the DVB-I content guide and DVB-SI event data, as the matching has already been done at a service instance level.

The ScheduleEvent entities within a ProgramLocation table are not necessarily returned in chronological order. The DVB-I client should ensure any re-ordering is appropriate for the UI layout.

There may be services in the broadcast metadata for which metadata is not available from Content Guide Server, the DVB-I client shall continue to use broadcast metadata for these services. For services supported by a Content Guide Server, there may still be events present in the broadcast metadata that are not represented in a Content Guide Server metadata. The device should continue to use the broadcast EIT metadata for these events.
6.5.4.3 Example Schedule responses

6.5.4.3.1 Timestamp Filtered Schedule Response

```xml
<?xml version="1.0" encoding="UTF-8"?>
<TVAMain xmlns="urn:tva:metadata:2024"
     xmlns:mpeg7="urn:tva:mpeg7:2008" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xmlns:xsd="http://www.w3.org/2001/XMLSchema" xml:lang="en">
  <ProgramDescription>
    <ProgramInformationTable xml:lang="en">
      <ProgramInformation programId="crid://channel7.co.uk/b01myjsy">
        <BasicDescription>
          <Title type="main">Bargain Hunt</Title>
          <Title type="secondary">01/01/2014</Title>
          <Synopsis length="short">The Bargain Hunt teams head to Staffordshire's County Showground.</Synopsis>
          <Synopsis length="medium">The Bargain Hunt teams head to Staffordshire's County Showground, where both experts face double trouble.</Synopsis>
          <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:3" type="main"/>
          <ParentalGuidance>
            <mpeg7:MinimumAge>15</mpeg7:MinimumAge>
          </ParentalGuidance>
          <ParentalGuidance>
            <ExplanatoryText length="long">Contains strong language and flash photography</ExplanatoryText>
          </ParentalGuidance>
          <RelatedMaterial>
            <MediaLocator>
              <MediaUri contentType="image/png">
                "https://img-ctv.mdata.co.uk/channel7/bargain_hunt.png"
              </MediaUri>
            </MediaLocator>
          </RelatedMaterial>
        </BasicDescription>
      </ProgramInformation>
      <ProgramInformation programId="crid://channel7.co.uk/b03bhc3n">
        <BasicDescription>
          <Title type="main">News at One</Title>
          <Synopsis length="medium">The latest national and international news stories from the News team, followed by weather</Synopsis>
          <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:2" type="main"/>
          <ParentalGuidance>
            <mpeg7:MinimumAge>13</mpeg7:MinimumAge>
          </ParentalGuidance>
          <ParentalGuidance>
            <ExplanatoryText length="long">May contain upsetting scenes</ExplanatoryText>
          </ParentalGuidance>
          <RelatedMaterial>
            <MediaLocator>
```
<VideoAttributes>
  <HorizontalSize>576</HorizontalSize>
  <VerticalSize>512</VerticalSize>
  <AspectRatio>16:9</AspectRatio>
</VideoAttributes>
<OtherIdentifier type="eit-programme-crid">
  crid://channel7.co.uk/5A795M
</OtherIdentifier>
<OtherIdentifier type="eit-series-crid">
  crid://channel7.co.uk/KCI4LM
</OtherIdentifier>

<InstanceDescription>
  <PublishedStartTime>2013-09-25T12:00:00Z</PublishedStartTime>
  <PublishedDuration>PT30M</PublishedDuration>
</InstanceDescription>

<OnDemandProgram serviceIDRef="3039">
  <Program crid="crid://channel7.co.uk/b01myjsy"/>

  <ProgramURL contentType="application/vnd.dvb.ait+xml">
    https://channel7.co.uk/ait.aitx?pid=b01myjsy
  </ProgramURL>

  <AuxiliaryURL contentType="application/vnd.dvb.ait+xml">
    https://channel7.co.uk/ait.aitx?template
  </AuxiliaryURL>

  <InstanceDescription>
    <Genre href="urn:fvc:metadata:cs:MediaAvailabilityCS:2014-07:media_available" type="other"/>
  </InstanceDescription>
  <PublishedDuration>PT1H</PublishedDuration>
  <StartOfAvailability>2013-09-25T12:03:09Z</StartOfAvailability>
  <EndOfAvailability>2013-10-02T09:59:00Z</EndOfAvailability>
  <DeliveryMode>streaming</DeliveryMode>
  <Free value="true"/>
</OnDemandProgram>
</ProgramLocationTable>
</ProgramDescription>
</TVAMain>

Figure 10: Example - Timestamp Filtered Schedule Response
6.5.4.3.2 Now/Next Filtered Schedule Response

<?xml version="1.0" encoding="UTF-8"?>
<TVAMain xml:lang="en" xmlns="urn:tva:metadata:2024" xmlns:mpeg7="urn:tva:mpeg7:2008"
../tva_metadata_3-1.xsd">
<ProgramDescription>
  <ProgramInformation programId="crid://example/12019073">
    <BasicDescription>
      <Title type="main">Cities</Title>
      <Synopsis length="medium">
        Cities serve as places of surprising opportunity for animals to thrive.
      </Synopsis>
      <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:2" type="main"/>
      <RelatedMaterial>
        <MediaLocator>
          <MediaUri contentType="image/png">
            http://tmsimg.com/assets/p13469377_e_h13_aa.jpg
          </MediaUri>
        </MediaLocator>
      </RelatedMaterial>
    </BasicDescription>
    <MemberOf crid="crid://dvb.org/metadata/schedules/now-next/now" index="1"/>
  </ProgramInformation>
  <ProgramInformation programId="crid://example/12019074">
    <BasicDescription>
      <Title type="main">Jason Peterson's Into The Wild</Title>
      <Synopsis length="medium">
        Jason Peterson hunts the most dangerous animals across North America and the world.
      </Synopsis>
      <RelatedMaterial>
        <MediaLocator>
          <MediaUri contentType="image/png">
            http://tmsimg.com/assets/p10870905_i_h13_aa.jpg
          </MediaUri>
        </MediaLocator>
      </RelatedMaterial>
    </BasicDescription>
    <MemberOf crid="crid://dvb.org/metadata/schedules/now-next/later" index="1"/>
  </ProgramInformation>
</ProgramDescription>
</TVAMain>
6.5.4.3.3 Now/Next (window) Filtered Schedule Response

```
<?xml version="1.0" encoding="UTF-8"?>
  <ProgramDescription>
    <ProgramInformation programId="crid://example/12019073">
      <BasicDescription>
        <Title type="main">Cities</Title>
        <Synopsis length="medium">
          Cities serve as places of surprising opportunity for animals to thrive.
        </Synopsis>
        <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:2" type="main"/>
        <RelatedMaterial>
          <MediaLocator>
            <MediaUri contentType="image/png">
              http://tmsimg.com/assets/p13469377_e_h13_aa.jpg
            </MediaUri>
          </MediaLocator>
        </RelatedMaterial>
      </BasicDescription>
      <MemberOf crid="crid://dvb.org/metadata/schedules/now-next/earlier" index="1"/>
    </ProgramInformation>
    <ProgramInformation programId="crid://example/12019074">
      <BasicDescription>
        <Title type="main">Jason Peterson's Into The Wild</Title>
        <Synopsis length="medium">
          Jason Peterson hunts the most dangerous animals across North America and the around the world.
        </Synopsis>
        <RelatedMaterial>
          <MediaLocator>
            <MediaUri contentType="image/png">
              http://tmsimg.com/assets/p13469377_e_h13_aa.jpg
            </MediaUri>
          </MediaLocator>
        </RelatedMaterial>
      </BasicDescription>
    </ProgramInformation>
  </ProgramDescription>
</TVAMain>
```
<ProgramInformation programId="crid://example/12019075">
  <BasicDescription>
    <Title type="main">Jungles</Title>
    <Synopsis length="medium">
      From the jungles of Brazil to Costa Rica, animals face life in the most competitive place on Earth.
    </Synopsis>
    <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:2" type="main" />
    <RelatedMaterial>
    </RelatedMaterial>
  </BasicDescription>
</ProgramInformation>

<ProgramInformation programId="crid://example/12019076">
  <BasicDescription>
    <Title type="main">We Bought a Zoo</Title>
    <Synopsis length="medium">Following his wife's death, Los Angeles journalist Benjamin Mee (Matt Damon) decides to make a fresh start by quitting his job and moving his children (Colin Ford, Maggie Elizabeth Jones) to an 18-acre property containing the Rosemoor Wildlife Park.</Synopsis>
    <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:5" type="main" />
    <RelatedMaterial>
    </RelatedMaterial>
  </BasicDescription>
</ProgramInformation>

<ProgramInformation programId="crid://example/12019077">
  <BasicDescription>
    <Title type="main">Scaly Adventures</Title>
    <Synopsis length="medium">The Scaly Adventures Crew journeys the world in search of amazing animals and incredible adventures.</Synopsis>
    <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:5" type="main" />
    <RelatedMaterial>
    </RelatedMaterial>
  </BasicDescription>
</ProgramInformation>
```xml
<ProgramLocationTable xml:lang="en">
  <Schedule serviceIDRef="tag:dvb.org,2023:example-cgsid_1" start="2020-06-14T08:30:00Z" end="2020-06-14T16:00:00Z">
    <ScheduleEvent>
      <Program crid="crid://example/12019073"/>
      <PublishedStartTime>2020-06-14T08:30:00Z</PublishedStartTime>
      <PublishedDuration>PT1H</PublishedDuration>
    </ScheduleEvent>
    <ScheduleEvent>
      <Program crid="crid://example/12019074"/>
      <PublishedStartTime>2020-06-14T09:30:00Z</PublishedStartTime>
      <PublishedDuration>PT30M</PublishedDuration>
    </ScheduleEvent>
    <ScheduleEvent>
      <Program crid="crid://example/12019075"/>
      <PublishedStartTime>2020-06-14T10:00:00Z</PublishedStartTime>
      <PublishedDuration>PT1H</PublishedDuration>
    </ScheduleEvent>
    <ScheduleEvent>
      <Program crid="crid://example/12019076"/>
      <PublishedStartTime>2020-06-14T11:00:00Z</PublishedStartTime>
      <PublishedDuration>PT2H30M</PublishedDuration>
    </ScheduleEvent>
    <ScheduleEvent>
      <Program crid="crid://example/12019077"/>
      <PublishedStartTime>2020-06-14T13:30:00Z</PublishedStartTime>
      <PublishedDuration>PT30M</PublishedDuration>
    </ScheduleEvent>
  </Schedule>
</ProgramLocationTable>
```

**Figure10b: Example – Now/Next Window Filtered Schedule Response**
6.5.4.4 Grouping in a Now/Next Filtered Schedule Response

Now/Next filtered scheduled responses have additional GroupInformation tables to indicate whether an event is the current on-air event, in the future, or in the past, see clauses 6.10.4 and 6.10.17.3.

A ScheduleEvent becomes a transitory member of one of these groups as a programme becomes close to transmission time and becomes on-air.

Informative: the use of structural group CRIDs to wrap the ScheduleEvent allows a client to unambiguously identify an order list of on-air and upcoming events.

GroupInformation tables are defined with a groupId from the following:

- crid://dvb.org/metadata/schedules/now-next/now
- crid://dvb.org/metadata/schedules/now-next/later
- crid://dvb.org/metadata/schedules/now-next/earlier

The ProgramInformation.MemberOf@crid attribute is used to associate ProgramInformation elements with GroupInformation elements.

The relative position of an event shall be determined by the ProgramInformation.MemberOf@index attribute:

- Where the @groupId is crid://dvb.org/metadata/schedules/now-next/now there shall only be one event, the current on-air event, with an index of 1.
- Where the @groupId is crid://dvb.org/metadata/schedules/now-next/later there shall be up to ten events. Events are forward order, so the event following the current on-air event shall have an index of 1.
- Where the @groupId is crid://dvb.org/metadata/schedules/now-next/earlier there shall be up to ten events. Events are in reverse order, so the event immediately prior to the current on-air event shall have an index of 1.

The number of events in the later and earlier groups depends on the now_next query parameter in the request:

- For now_next=true there shall be one event in the latter group and none in the earlier group.
- For now_next=window there shall be up to ten events in each of the later and earlier groups.

6.5.5 Restart Application Linking

Restart, sometimes known as Start Again, offers a viewer the ability to watch a programme currently in progress on a linear broadcast channel from the beginning. If Restart is available for a programme, the Content guide Server provides the link to an IP delivered asset as part of the Now/Next filtered Schedule response.

Restart information may be provided within the InstanceDescription of a ScheduleEvent in the ProgramLocationTable for a current on-air event. There are two parts to Restart information, a Genre element and a RelatedMaterial element, as shown in figure 11.

```xml
<Genre href="urn:fvc:metadata:cs:RestartAvailabilityCS:2018:restart_check" type="other"/>
<RelatedMaterial>
  <MediaLocator>
    <MediaUri>https://channel7.co.uk/channel7/restart/programme.aitx</MediaUri>
    <AuxiliaryURI>
      https://channel7.co.uk/channel7/restart/template.aitx
    </AuxiliaryURI>
  </MediaLocator>
</RelatedMaterial>
```
Figure 11: Example - Restart Output - InstanceDescription of ScheduleEvent (part)

The RelatedMaterial element with an @href attribute carrying the value urn:fvc:metadata:cs:HowRelatedCS:2018:restart and provides two links. The MediaUri is the Restart XML AIT which is a deeplink to the Restart stream in a Content Provider's player. The AuxiliaryURI is the Restart Template XML AIT that a device shall use to determine compatibility with the Restart stream. The Template XML AIT rules of clause 5.2.4.4 apply.

The Genre provides information about the availability of Restart. Depending on the supplied URN, the DVB-I client shall behave according to the following rules:

- **restart_available**
  

  Subject to Template AIT rules of clause 5.2.4.4, the DVB-I client shall assume that the Restart stream is available. The option to Restart shall be displayed without checking the Restart AIT first. The Restart AIT shall only be requested if the user chooses to restart. A DVB-I client shall be robust to the possibility that a request for the Restart AIT fails - for example, an error message should be displayed to the user.

- **restart_check**
  
  **urn:fvc:metadata:cs:RestartAvailabilityCS:2018:restart_check**

  Restart may be available, but the DVB-I client needs to check with the Content Provider. Assuming the Template AIT rules of clause 5.2.4.4 have been satisfied, the DVB-I client shall request the Restart AIT from the Content Provider before displaying the option to restart to the user. If a valid Restart AIT is returned, then the DVB-I client shall display the option to restart to the user but if an invalid Restart AIT is returned then the DVB-I client shall not display the option to restart to the user.

- **restart_pending**
  

  Restart may be available later but is not currently. A DVB-I client shall not request the Restart AIT and shall not display the option to restart to the user.

The option to restart shall not be presented to the user in any case other than when restart_available or restart_check is signalled, and in the case of restart_check if a successful response has been received to requesting the Restart AIT.

A DVB-I client shall obey cache control headers on Now/Next and AIT responses. In particular, if checking the Restart AIT for an event with a status of restart_check results in failure, the Restart AIT shall not be requested again until the original response has expired.

### 6.6 Programme Information Request

#### 6.6.1 Introduction

The ProgramInfoEndpoint provides detailed information on a single programme identified by programme identifier.

#### 6.6.2 Request

The following API endpoint allows a DVB-I client to retrieve detailed information on a specific programme, including additional enhanced metadata such as a longer synopsis, list of credits and keywords that are not provided via the ScheduleInfo endpoint. The intention is that this method may be used to provide more in-depth information on a programme prompted by user interaction.

The identifier used to request information on a programme shall be a programme identifier, taken from a response to the ScheduleInfo endpoint. Therefore, the expectation is that discovery of available programmes is still achieved via the ScheduleInfo endpoint to provide additional information only when required.
The programme identifier shall take the form of a CRID (see clause 6.10.4). Query strings shall use those characters and encoding rules defined in clause 6.2.2.

The request URL shall be composed as follows:

```
<ProgramInfoEndpoint>?pid=<program_id>&image_variant=<variant>
```

where:

- **program_id**: shall be a single CRID as retrieved from the [@programId] attribute of a `ProgramInformation` element or a [@crid] attribute taken from `ScheduleEvent` or `OnDemandProgram`. Relevant reserved characters shall be percent-encoded as defined in clause 6.2.2.

- **variant**: (Optional) shall specify an image variant (see clause 5.2.8.2.1) for the image URLs provided in the response.

In the case where the CRID provided is known to a Content Guide Server, the response shall be a 200 (OK) HTTP response containing a well-formed XML document consisting of a `ProgramInformationTable` and `ProgramLocationTable` (see clause 6.10.1).

- The `ProgramInformationTable` shall contain a single `ProgramInformation` element and the `ProgramInformation` element shall contain all data on the requested programme including both the additional data supported by this endpoint and all programme data provided in the Schedules endpoint response.

- The `ProgramLocationTable` may contain a single `OnDemandProgram` element representing the current On Demand availability of this programme, if relevant. If the programme is not currently available On Demand, the `ProgramLocationTable` shall still be present but shall not contain any child elements.

In the case where the CRID is not known to a Content Guide Server then a 200 (OK) HTTP response shall be returned but the `ProgramInformationTable` and `ProgramLocationTable` shall not contain any elements.

As stated in clause 4.3.2.1, the expiry time contained in the `Cache-Control: max-age` header in returned programme results shall be respected.

### 6.6.3 Response

A Content Guide Server shall return a well-formed XML document consisting of the following tables (see clause 6.10.1):

- `ProgramInformationTable`
- `ProgramLocationTable`

The following attributes may be used to associate `ProgramInformation` and `OnDemandProgram` elements provided by this endpoint with `ScheduleEvent` elements and `OnDemandProgram` elements provided in other responses:

- `ProgramInformation@programId`
- `ScheduleEvent.Program@crid`
- `OnDemandProgram.Program@crid`

CRIDs used to provide linkage between TV-Anytime XML fragments shall not be assumed to be consistent with any CRIDs provided in DVB-C/S/T broadcast Service Information (i.e. carried in the Content Identifier Descriptor as defined in ETSI TS 102 323 [28]).

The Programme Information endpoint method shall return an extended `ProgramInformation` fragment meaning that it shall contain all of the programme metadata provided in a Schedule and may contain additional extended information if available. The `OnDemandProgram` information provided via this endpoint shall be complete and as extensive as that
provided via any other endpoint. Therefore, the data from this API endpoint may safely be used to replace any programme metadata previously stored by the DVB-I client from a Schedules response if necessary.

![TVAMain (root element)](image)

**Figure 12: Detailed Programme Information response data structure**

**Example URL and response:**

```
<ProgramInfoEndpoint>?pid=crid://channel7.co.uk/b01myjsy
```

```xml
<?xml version="1.0" encoding="UTF-8"?>
<TVAMain xmlns="urn:tva:metadata:2024"
  xmlns:mpeg7="urn:tva:mpeg7:2008" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema" xml:lang="en">
  <ProgramDescription>
    <ProgramInformationTable xml:lang="en">
      <ProgramInformation programId="crid://channel7.co.uk/b01myjsy">
        <BasicDescription>
          <Title type="main">Bargain Hunt</Title>
          <Title type="secondary">01/01/2014</Title>
          <Synopsis length="short">The Bargain Hunt teams head to Staffordshire’s County Showground.</Synopsis>
          <Synopsis length="medium">The Bargain Hunt teams head to Staffordshire’s County Showground, where both experts face double trouble.</Synopsis>
          <Synopsis length="long">The Bargain Hunt teams head to Staffordshire’s County Showground, where both experts face double trouble. David Harper heads up two Toms for the red team, while twin sisters Elizabeth and Rachel are guided by Jonathan Pratt for the blue team. Tim Wonnacott travels to Bath to visit one of the city’s greatest architectural delights.</Synopsis>
          <Keyword>FAMILY LIFE</Keyword>
          <Keyword>RELATIONSHIPS</Keyword>
          <Keyword type="other">Critic’s Choice</Keyword>
          <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:3" type="main"/>
          <ParentalGuidance/>
        </BasicDescription>
      </ProgramInformation>
    </ProgramInformationTable>
  </ProgramDescription>
</TVAMain>
```
<mpeg7:MinimumAge>15</mpeg7:MinimumAge>
</ParentalGuidance>
<ParentalGuidance>
<ExplanatoryText length="long">Contains strong language and flash photography</ExplanatoryText>
</ParentalGuidance>
<CreditsList>
<CreditsItem role="urn:tva:metadata:cs:TVARoleCS:2011:V20">
<OrganizationName>International Studios Limited</OrganizationName>
</CreditsItem>
<CreditsItem role="urn:tva:metadata:cs:TVARoleCS:2011:AD6">
<PersonName>
<mpeg7:GivenName>Jeremy</mpeg7:GivenName>
<mpeg7:FamilyName>Brown</mpeg7:FamilyName>
</PersonName>
</CreditsItem>
<CreditsItem role="urn:mpeg:mpeg7:cs:RoleCS:2001:ACTOR">
<PersonName>
<mpeg7:GivenName>William</mpeg7:GivenName>
<mpeg7:FamilyName>Johnson</mpeg7:FamilyName>
</PersonName>
<Character>
<mpeg7:GivenName>Billy</mpeg7:GivenName>
<mpeg7:FamilyName>Johns</mpeg7:FamilyName>
</Character>
</CreditsItem>
</CreditsList>
<RelatedMaterial>
</RelatedMaterial>
</ProgramInformation>
</ProgramInformationTable>
<ProgramLocationTable xml:lang="en">
<OnDemandProgram serviceIDRef="https://channel7.co.uk/service_a_app">
<Program crid="crid://channel7.co.uk/b01myjsy"/>
<ProgramURL contentType="application/vnd.dvb.ait+xml">
https://channel7.co.uk/ait.aitx?pid=b01myjsy</ProgramURL>
<AuxiliaryURL contentType="application/vnd.dvb.ait+xml">
https://channel7.co.uk/ait.aitx?template</AuxiliaryURL>
</OnDemandProgram>
</ProgramLocationTable>
<Genre href="urn:fvc:metadata:cs:MediaAvailabilityCS:2014-07:media_available" type="other"/>
<AVAttributes>
<VideoAttributes>
<HorizontalSize>576</HorizontalSize>
<VerticalSize>512</VerticalSize>
6.7 More Episodes Request

6.7.1 Introduction

The MoreEpisodesEndpoint provides a list of more episodes related to a single programme identified by programme identifier, filtered for regional relevance and paginated. This may be referred to elsewhere as "Siblings Group Information".

6.7.2 Request

The More Episodes endpoint allows a DVB-I client to retrieve a list of more episodes related to a specific programme. The programme episodes may be available from more than one service within the ServiceList.

The identifier used to request more episodes related to a programme shall be a programme identifier, taken from a response to the Schedules, Programme Information, endpoints. This programme identifier shall take the form of a CRID (see clause 6.10.4).

More Episodes results shall be provided in TV-Anytime, ETSI TS 102 822-3-1 [7], compliant data structures, similar to the other API endpoints described within the present document. This format is defined in clause 6.7.3 while details on the pagination of these results can be found in clause 6.9.

More Episodes results shall be filtered by a Content Guide Server to be regionally relevant based on region information (@regionID from the provided RegionList, see clause 5.6.2) provided by the DVB-I client in the query. As such, the DVB-I client should not filter any results returned by the query.

More Episode requests including query strings shall be bounded by the encoding rules defined in clause 6.2.2.

**URL format:**

```
<MoreEpisodesEndpoint>?pid=<program_id>&type=ondemand&regionID[]=<region_id_1>&regionID[]=<region_id_2>...&image_variant=<variant>
```
where:

- **program_id**: shall be a single CRID as retrieved from the @programId attribute of a ProgramInformation element or a @crid attribute taken from ScheduleEvent or OnDemandProgram. Relevant reserved characters shall be percent-encoded as defined above.

- **region_id_x**: (Optional) shall be a regionID as determined by the DVB-I client (see clause 5.6.2). More than one regionID[] parameter may be passed.

- **variant**: (Optional) shall specify an image variant (see clause 5.2.8.2.1) for the image URLs provided in the response.

Assuming the request is correctly formatted the response shall be a 200 (OK) HTTP response containing an XML body as defined in clause 6.7.3.

Behaviour regarding Cache-Control support (clause 4.3.2.1) and If-Modified-Since conditional requests (clause 4.3.2.2) shall be supported for More Episode requests as described in the relevant clauses of the present document.

### 6.7.3 Response

A Content Guide Server shall return a well-formed XML document consisting of the following tables (see clause 6.10.1):

- ProgramInformationTable
- GroupInformationTable
- ProgramLocationTable

The following attributes should be matched in order to associate ProgramInformation elements and OnDemandProgram elements within the response:

- ProgramInformation@programId
- OnDemandProgram.Program@crid

CRIDs used to provide linkage between TV-Anytime XML fragments shall not be assumed to be consistent with any CRIDs provided in broadcast Service Information (i.e. carried in the Content Identifier Descriptor as defined in ETSI TS 102 323 [28]).

All OnDemandProgram elements in the returned ProgramLocation table shall have a matching entry in the returned ProgramInformation table. The ProgramInformation table shall only describe content present in the ProgramLocationTable.

The response shall contain the following information for each item of matching content:

- ProgramInformation (see clause 6.10.4)
- OnDemandProgram (see clause 6.10.8.3)

The details of the "minimal" data provided in More Episodes results may be found in the relevant portions of the profile tables in clause 6.10 and a complete example is provided in figure 14.

Each response shall contain a single structural Results Group GroupInformation fragment to which all results are a member.

The response may be paginated as defined in clause 6.9. The number of results provided per page of results shall be managed by the Content Guide Server. The GroupInformation@numOfItems attribute shall indicate the total number of results across all pages within a Content Guide Server, however the value may not reflect the number of results visible to the user due to content compatibility or availability signalled in the Template XML AIT.
All ProgramInformation fragments shall be associated with this Results Group through the
ProgramInformation.MemberOf element. A DVB-I client shall display results in ascending order using the values
from the MemberOf@index attribute. These values shall indicate ordering of the total set of results, rather than within
the scope of a page.

Each OnDemandProgram element shall contain a @serviceIDRef attribute referencing the
Service.UniqueIdentifier or Service.ContentGuideServiceRef of a service. This association may be used
by a DVB-I client, for example to decorate results with the logo of the service.

All OnDemandProgram fragments returned from a More Episodes query shall be assumed to be currently available
from the Content Provider or available in the near future. Before displaying the result to the user, the DVB-I client shall
process the Template XML AIT for each OnDemandProgram as specified in clause 5.2.4.4 to ensure that the content is
supported by the device. In the event that this process indicates incompatibility between the content and the DVB-I
client or the XML AIT request fails, the result shall be hidden from the user.

The ProgramInformation and OnDemandProgram data provided in More Episodes responses is limited in
comparison to that retrieved from the Schedules or Detailed Programme Information endpoints. This is to ensure that
results documents are of a manageable size whilst providing sufficient information to present a basic set of results to a
user and directly launch On Demand content if required. A complete ProgramInformation and OnDemandProgram
fragment for any result may be requested using the Detailed Programme Information endpoint (see clause 6.6).

In the case that no results are available for the provided query string, the response shall be a 200 (OK) HTTP status and
consist of an XML document containing an empty ProgramInformationTable and empty
ProgramLocationTable. In this situation, the GroupInformationTable shall contain a Results Group where the
GroupInformation@numOfItems attribute has a value of 0 (see clause 6.9 for further detail).

The response may contain ScheduleEvent elements indicating future broadcasts/streaming events. The response
shown below depicts a request for the third page (refer to clause 6.9) of results.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<TVAMain xmlns="urn:tva:metadata:2024" xmlns:mpeg7="urn:tva:mpeg7:2008"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xml:lang="en">
  <ProgramDescription>
    <ProgramInformationTable xml:lang="en">
      <ProgramInformation programId="crid://channel7.co.uk/n19alrr1">
        <BasicDescription>
          <Title type="main">Roland Rat</Title>
          <Title type="secondary">Series 1, Episode 1</Title>
          <RelatedMaterial>
            <MediaLocator>
              <MediaUri contentType="image/jpeg">
                https://img-ctv.mdata.co.uk/channel7/rat1.jpeg</MediaUri>
            </MediaLocator>
          </RelatedMaterial>
        </BasicDescription>
        <MemberOf xsi:type="MemberOfType" index="5"
crid="crid://mdata.co.uk/more-episodes/results"/>
      </ProgramInformation>
      <ProgramInformation programId="crid://channel7.co.uk/n19alrr2">
        <BasicDescription>
          <Title type="main">Roland Rat</Title>
          <Title type="secondary">Series 1, Episode 2</Title>
          <RelatedMaterial>
            <MediaLocator>
              <MediaUri contentType="image/jpeg">
                https://img-ctv.mdata.co.uk/channel7/rat2.jpeg</MediaUri>
            </MediaLocator>
          </RelatedMaterial>
        </BasicDescription>
      </ProgramInformation>
    </ProgramInformationTable>
  </ProgramDescription>
</TVAMain>
```
6.8 Group Information (Box Set) Request

6.8.1 Introduction

The **GroupInfoEndpoint** is used to provide three APIs to support content Grouping (Box Sets) on the DVB-I client, providing metadata for On Demand and scheduled content that has been curated into box sets for promotion and allowing this content to be discovered via a set of curated categories. These endpoints are listed here and described in detail in the subsequent clauses:

- Box Set Categories, providing a list of categories for Box Sets
- Box Set Lists, providing a list of Box Sets available within a category
- Box Set Contents, providing a list of episodes within a specific Box Set

6.8.2 Box Set Categories

6.8.2.1 Introduction

This provides a list of categories to which Box Sets may belong.

6.8.2.2 Request

The Box Set Categories endpoint is provided in order to allow the DVB-I client to present a list of available categories a user may select in order to subsequently filter Box Sets. The categories themselves may be static and long running, or short-lived (seasonal).

Box Set Categories requests may optionally include one of more service identifiers which will return only Categories related to those Service(s).

**URL Format:**

```xml
<GroupInfoEndpoint>categories?sid[]=<service_id_1>&sid[]=<service_id_2>...&regionID[]=<region_id_1>&regionID[]=<region_id_2>...&image_variant=<variant>
```

where:

- **service_id_x**: (Optional) shall be a `Service.UniqueIdentifier` or `Service.ContentGuideServiceRef` of a service. More than one `sid[]` parameter may be passed.
- **region_id_x**: (Optional) shall be a `regionID` as determined by the DVB-I client (see clause 5.6.2). More than one `regionID[]` parameter may be passed.
variant: (Optional) shall specify an image variant (see clause 5.2.8.2.1) for the image URLs provided in the response.

If the request is correctly formatted the response shall be a 200 (OK) HTTP response containing an XML body as defined in clause 6.8.2.3 while details on the pagination of these results can be found in clause 6.9.

For response codes during error conditions and expected DVB-I client behaviour, see clause 4.3.2.2 with reference to any content guide API endpoint.

Behaviour regarding Cache-Control support (clause 4.3.2.1) and If-Modified-Since conditional requests (clause 4.3.2.2) shall be supported for Box Sets Categories requests.

6.8.2.3 Response

A Content Guide Server shall return a well-formed XML document containing only the following table (see clause 6.10.1):

- GroupInformationTable

The GroupInformationTable shall consist of a set of GroupInformation fragments which comply with the schema definition detailed in clause 6.10.17.2. This shall include a 'parent' GroupInformation fragment to group the categories and a GroupInformation fragment for each available category.

The parent GroupInformation fragment shall indicate the number of categories present in the response using the @numOfItems attribute. This group shall not be displayed in the user interface and shall be identified by a structural @groupId attribute whose value shall be crid://dvb.org/metadata/collections/boxsets/categories.

The DVB-I client may use the MemberOf@index attribute to determine the order of categories presented in the user interface.

The value of the GroupInformation@groupId attribute shall be provided in the CRID format. The value of this attribute shall be specified as a value for the @groupId parameter of the Box Set Lists endpoint as defined in clause 6.8.3.

```xml
<?xml version="1.0" encoding="UTF-8"?>
  <ProgramDescription>
    <GroupInformationTable>
      <GroupInformation groupId="crid://dvb.org/metadata/collections/boxsets/categories" ordered="true" numOfItems="2">
        <GroupType xsi:type="ProgramGroupTypeType" value="otherCollection"/>
        <BasicDescription>
          <Title>Category Group</Title>
          <!-- Other basic description details -->
        </BasicDescription>
      </GroupInformation>
      <GroupInformation groupId="crid://dvb.org/metadata/collections/boxsets/categories/decent_comedy">
        <GroupType xsi:type="ProgramGroupTypeType" value="otherCollection"/>
        <BasicDescription>
          <Title>Decent Comedy</Title>
          <Synopsis length="short">Quality cult comedies from the likes of Armando Iannucci, Chris Morris and Stewart Lee</Synopsis>
          <!-- Other basic description details -->
        </BasicDescription>
      </GroupInformation>
    </GroupInformationTable>
  </ProgramDescription>
</TVAMain>
```
6.8.3 Box Set Lists

6.8.3.1 Introduction

This provides the list of curated Box Sets in a category obtained from the Box Set Categories endpoint. Nested box sets are not supported.

6.8.3.2 Request

The Box Set Lists endpoint is provided in order to allow a DVB-I client to present the list of Box Sets available in a particular Box Set category.

Lists of Box Sets shall be requested by category by providing a single CRID as a query parameter. The CRID shall be the value of a `GroupInformation@groupId` attribute drawn from a Box Set Categories endpoint response, as specified in clause 6.8.2.3.

Box Sets shall be filtered by the Content Guide Server to be regionally relevant based on region identifiers and/or service identifiers provided by the DVB-I client in the query. The DVB-I client shall not filter the results, whether by region ID or other means.
URL format:

```
<GroupInfoEndpoint>?groupId=<group_id>&sid[]=<service_id_1>&sid[]=service_id_2&...
&regionID[]=region_id_1&regionID[]=region_id_2&...&image_variant=<variant>
```

where:

- **group_id**: (Mandatory) shall be a single CRID as retrieved from the `@groupId` attribute of a `GroupInformation` fragment from a Box Sets Categories response (see clause 6.8.2.3). Relevant reserved characters shall be percent-encoded as defined in clause 6.2.2.

- **service_id_x**: (Optional) shall be a `Service.UniqueIdentifier` or `Service.ContentGuideServiceRef` of a service. More than one `sid[]` parameter may be passed.

- **region_id_x**: (Optional) shall be a `regionID` as determined by the DVB-I client (see clause 5.6.2). More than one `regionID[]` parameter may be passed.

- **variant**: (Optional) shall specify an image variant (see clause 5.2.8.2.1) for the image URLs provided in the response.

If the request for a Box Set List is correctly formatted the response shall be a 200 (OK) HTTP response containing an XML body as defined in clause 6.8.3.3 while details on the pagination of these results can be found in clause 6.9.

For response codes in error conditions and expected DVB-I client behaviour, see clause 4.3.3 with reference to any content guide API endpoint.

Behaviour regarding Cache-Control (clause 4.3.2.1) and If-Modified-Since conditional requests (clause 4.3.2.2) shall be supported for Box Set Group requests.

### 6.8.3.3 Response

The Content Guide Server shall return a well-formed XML document containing only the following table (see clause 6.10.1):

- **GroupInformationTable**

The `GroupInformationTable` shall consist of a set of `GroupInformation` fragments which comply with the schema definition detailed in clause 6.10.17.2.

The position of the individual Box Set shall be indicated in the `GroupInformation.MemberOf@index` attribute.

The same Box Set may be present in the response for different query filters requested by the DVB-I client. In this case, the Box Set item shall carry the same CRID value in the `GroupInformation@groupId` attribute and may contain a different value in the `MemberOf@index` attribute between requests.

The response may be paginated as defined in clause 6.9. The number of results provided per page of results shall be managed by the Content Guide Server. The `@numOfItems` attribute in the parent `GroupInformation` fragment shall indicate the total number of results across all pages within the Content Guide Server, however the value may not reflect the number of items visible to the user due to content compatibility or availability signalled in the Template XML AIT. This group shall be identified by a structural `@groupId` attribute whose value represents the CRID of a category group.

Information (title, synopsis and image) about each Box Set shall be contained in a `GroupInformation.BasicDescription` fragment (see clause 6.10.17.2). The identifier of the service, i.e. the value of `Service.UniqueIdentifier` or `Service.ContentGuideServiceRef`, shall be conveyed in the `GroupInformation@serviceIDRef` attribute.

In the case that no Box Sets are available for a specified Box Set Category, the response shall be a 200 (OK) HTTP status and consist of an XML document containing a single `GroupInformation` fragment in which the `@numOfItems` attribute shall contain a value of 0.
<ProgramDescription>
  <GroupInformation
    groupId="crid://mdata.co.uk/collections/boxsets/categories/decent_comedy"
    ordered="true" numOfItems="2">
    <GroupType xsi:type="ProgramGroupTypeType" value="otherCollection"/>
    <BasicDescription>
      <Title>Decent Comedy</Title>
    </BasicDescription>
  </GroupInformation>
  <GroupInformation
    groupId="crid://mdata.co.uk/collections/boxsets/stewart_lee"
    serviceIDRef="http://www.mybroadcaster.co.uk/mdata/service/apps/broadcast_two">
    <GroupType xsi:type="ProgramGroupTypeType" value="otherCollection"/>
    <BasicDescription>
      <Title>Stewart Lee's Comedy Vehicle</Title>
      <Synopsis length="medium">
        Stand-up series from one of Britain's most highly regarded comedians.
      </Synopsis>
    </BasicDescription>
  </GroupInformation>
  <GroupInformation
    groupId="crid://mdata.co.uk/recommendations/collections/boxsets/green_wing"
    serviceIDRef="http://www.channel4.com/vps/dtt/service/apps/c4">
    <GroupType xsi:type="ProgramGroupTypeType" value="otherCollection"/>
    <BasicDescription>
      <Title>Green Wing</Title>
      <Synopsis length="medium">
        Quick-fire (and occasionally slow motion) genre-defying comedy, set in a surreal hospital but lacking medical content. From the award-winning team behind Smack the Pony.
      </Synopsis>
    </BasicDescription>
  </GroupInformation>
</ProgramDescription>
6.8.4 Box Set Contents

6.8.4.1 Introduction

This provides a list of episodes available in a Box Set (obtained from the Box Set Lists endpoint), including basic details about each episode, filtered for regional relevance and optionally paginated.

6.8.4.2 Request

The Box Set Contents endpoint is provided in order to allow the DVB-I client to present a list of episodes available in a particular Box Set.

Lists of episodes in a Box Set shall be requested providing a single CRID as a query parameter. The CRID shall be the value of a GroupInformation@groupId attribute drawn from a Box Set Lists endpoint response, as specified in clause 6.8.3.3.

The episodes shall be filtered by the Content Guide Server to be regionally relevant based on regionID values provided by the DVB-I client in the query. The DVB-I client shall not filter the results, whether by region ID or other means.

An optional parameter allows the selection of either a response which supports grouping within the Box Set Contents, for example as series or seasons, or a paginated response, as described in clause 6.9. If a paginated response is selected then only a single GroupInformation element, of which all ProgramInformation elements are members, is allowed.

URL format:

<GroupInfoEndpoint>contents?groupId=<group_id>&type=<results_type>&format=<format_option>&regionID[]=region_id_1&regionID[]=region_id_2>&image_variant=<variant>
where:

- **group_id**: (Mandatory) shall be a single CRID as retrieved from the @groupId attribute of a GroupInformation fragment from a Box Set Lists Response (see clause 6.8.3.3). Relevant reserved characters shall be percent-encoded as defined in clause 6.2.2.

- **results_type**: (Optional) shall carry a value of ondemand or linear to filter the results to OnDemand or ScheduleEvent respectively.

- **format**: (Optional) shall carry a value of paginated or grouped to select the format of the response. The default is paginated.

- **region_id_x**: (Optional) shall be a regionID as determined by the DVB-I client (see clause 5.6.2). More than one regionID[] parameter may be passed.

- **variant**: (Optional) shall specify an image variant (see clause 5.2.8.2.1) for the image URLs provided in the response.

Assuming the request is correctly formatted the response shall be a 200 (OK) HTTP response containing an XML body as defined in clause 6.8.4.3 while details on the pagination of these results can be found in clause 6.9.

For response codes in error conditions and expected DVB-I client behaviour, see clause 4.3.3 with reference to any content guide API endpoint.

Behaviour regarding Cache-Control (clause 4.3.2.1) and If-Modified-Since conditional requests (clause 4.3.2.2) shall be supported for Box Set Contents requests.

**Example URL:**

```
<GroupInfoEndpoint>/contents?groupId=crid://mdata.co.uk/comedy&type=ondemand&format=grouped&regionID[]=1234&regionID[]=5678
```

### 6.8.4.3 Response

The Content Guide Server shall return a well-formed XML document consisting of the following tables (see clause 6.10.1):

- ProgramInformationTable
- GroupInformationTable
- ProgramLocationTable

The following attributes should be matched in order to associate ProgramInformation elements and OnDemandProgram elements within the response:

- ProgramInformation@programId
- OnDemandProgram.Program@crid

CRIDs used to provide linkage between TV-Anytime XML fragments shall not be assumed to be consistent with any CRIDs provided in broadcast Service Information (i.e. carried in the Content Identifier Descriptor as defined in ETSI TS 102 323 [28]).

All On Demand programmes in the returned ProgramLocation table shall have a matching entry in the returned ProgramInformation table. The ProgramInformation table shall only describe content present in the ProgramLocationTable.

The response shall contain the following information for each item of matching content:

- ProgramInformation (see clauses 6.10.4 and 6.10.5.4)
The details of the elements provided in Box Set results may be found in the relevant portions of the profile tables in clause 6.10 and complete examples are provided below.

Each response shall contain at least one Results Group GroupInformation fragment. The Results Group shall be identified by a structural @groupId attribute.

One Results Group GroupInformation fragment shall represent the whole Box Set to which all ProgramInformation elements will belong. Optionally, if the format parameter is set to grouped, one or more GroupInformation fragments will represent series or other groupings, each of these groups shall belong to the parent GroupInformation fragment. Where the second level of grouping is used, all ProgramInformation elements shall belong to both the parent and one of the second level groups.

When the format parameter is to paginated in the request, the response may be paginated as defined in clause 6.9. The number of results provided per page of results shall be managed by the Content Guide Server. The GroupInformation@numOfItems attribute shall indicate the total number of results for each group across all pages within the Content Guide Server, however the value may not reflect the number of items visible to the user due to content compatibility or availability signalled in the Template XML AIT.

All ProgramInformation fragments shall be associated with one or two Results Groups through the ProgramInformation.MemberOf element. The DVB-I client shall display results in ascending order using the values from the MemberOf@index attribute. These values shall indicate ordering of the total set of results, rather than within the scope of a page of results returned by the Content Guide Server.

Each OnDemandProgram element shall contain a @serviceIDRef attribute referencing the Service.UniqueIdentifier or Service.ContentGuideServiceRef of a service. This association may be used by the DVB-I client, for example, to decorate episodes with the logo of the service.

The ProgramInformation and OnDemandProgram data provided in Box Set Contents responses is limited in comparison to that retrieved from the Schedules or Detailed Programme Information endpoints. This is to ensure that results documents are of a manageable size whilst providing sufficient information to present a basic set of results to a user and directly launch On Demand content if required. A complete ProgramInformation and OnDemandProgram fragment for any result may be requested using the Detailed Programme Information endpoint (see clause 6.6).

In the case that no results are available for the provided query string, the response shall be a 200 (OK) HTTP status and consist of an XML document containing an empty ProgramInformationTable and empty ProgramLocationTable. In this situation, the GroupInformationTable shall contain a Results Group where the GroupInformation@numOfItems attribute has a value of 0 (see clause 6.9 for further detail).
<ProgramLocationTable>
  <ProgramLocation>
    <ProgramURL contentType="application/vnd.dvb.ait+xml">
      https://www.live.tvapps.co.uk/ait/launch/iplr.aitx?deeplink=tv/playback/b00jd8gp
    </ProgramURL>
    <AuxiliaryURL contentType="application/vnd.dvb.ait+xml">
      https://www.live.mybroadcaster.co.uk/ait/launch/iplayer.aitx
    </AuxiliaryURL>
    <PublishedDuration>PT00H30M00S</PublishedDuration>
    <StartOfAvailability>2018-07-13T08:00:00Z</StartOfAvailability>
    <EndOfAvailability>2019-01-12T09:00:00Z</EndOfAvailability>
    <Free value="true"/>
  </ProgramLocation>
</ProgramLocationTable>

<ProgramLocationTable>
  <ProgramLocation>
    <Program crid="crid://mybroadcaster.co.uk/mdata/episode/b00jhpy6"/>
    <ProgramURL contentType="application/vnd.dvb.ait+xml">
      https://www.live.mytvapps.co.uk/ait/launch/iplr.aitx?deeplink=tv/playback/b00jhpy6
    </ProgramURL>
    <AuxiliaryURL contentType="application/vnd.dvb.ait+xml">
      https://www.live.mybroadcastertvapps.co.uk/ait/launch/iplayer.aitx
    </AuxiliaryURL>
    <InstanceDescription>
      <Genre href="urn:fvc:metadata:cs:MediaAvailabilityCS:2014-07:media_available" type="other"/>
      <AVAttributes>
        <AudioAttributes>
          <MixType href="urn:mpeg:mpeg7:cs:AudioPresentationCS:2001:3"/>
        </AudioAttributes>
        <VideoAttributes>
          <HorizontalSize>1920</HorizontalSize>
          <VerticalSize>1080</VerticalSize>
          <AspectRatio>16:9</AspectRatio>
        </VideoAttributes>
        <AccessibilityAttributes>
          <SubtitleAttributes>
            <Coding href="urn:tva:metadata:cs:SubtitleCodingFormatCS:2023:3.2.2"/>
            <Coding href="urn:tva:metadata:cs:SubtitleCodingFormatCS:2023:3.6.1.2"/>
            <SubtitleLanguage>qaa</SubtitleLanguage>
            <SuitableForTTS>false</SuitableForTTS>
          </SubtitleAttributes>
        </AccessibilityAttributes>
      </AVAttributes>
    </InstanceDescription>
    <PublishedDuration>PT00H30M00S</PublishedDuration>
    <StartOfAvailability>2018-07-13T08:00:00Z</StartOfAvailability>
    <EndOfAvailability>2019-01-12T09:00:00Z</EndOfAvailability>
    <Free value="true"/>
  </ProgramLocation>
</ProgramLocationTable>
</ProgramDescription>
</TVAMain>
6.9 Pagination of results

In this clause, a 'page' of results refers to how a Content Guide Server subdivides results, while a 'screen' of results refers to how a manufacturer displays these results in their UI.

Due the variability in the number of response documents, a Content Guide Server may need to paginate the results. The size of pages will be controlled by a Content Guide Server configuration. The DVB-I client shall be capable of handling page sizes containing up to a maximum of 30 results. The number of results provided on each page may vary up to this maximum and therefore the DVB-I client shall behave gracefully where a smaller page size is returned. It is not intended that there is a connection between the page size returned by a Content Guide Server and the number of items displayed on a single screen of results within a manufacturer's UI.

Notwithstanding the pagination model provided in the previous paragraph, a DVB-I client may request a different pagination technique be used by the Content Guide Server. Adherence to the client request is at the discretion of the Content Guide Server which may provide a different pagination model to that being requested. Specifically, the DVB-I client can include a `page_size=number` query parameter in the following request types.

- More Episodes request (clause 6.7)
- Box Set Categories request (clause 6.8.2.2)
- Box Set Lists request (clause 6.8.3.2)
- Box Set Contents request (clause 6.8.4.2)

If the `page_size` query parameter is included in the request, the Content Guide Server should attempt to provide the results using the requested pagination.

Parameter format:

```
page_size=<number> | all
```

where:

- `number`: denotes the number of entries that should be included in each page of results.
- `all`: denotes that all entries should be provided without any pagination.

If the Content Guide Server cannot satisfy the requested number of entries in each page of results, then it can apply its own pagination model.

Links between pages shall be provided in each results document to allow navigation within the paginated set of results. The navigation links are held as RelatedMaterial elements in the GroupInformation fragment of the response and the presence of these links shall be used to determine whether there are further pages of results available.

The relative links can be identified by the `HowRelated@href` attribute.

<table>
<thead>
<tr>
<th>Relative page name</th>
<th>HowRelated@href attribute</th>
</tr>
</thead>
</table>
By default, the first page of results shall be returned when a request is executed and navigation shall always begin from this point.

A DVB-I client shall only use the provided relative links, without modification, in order to traverse the results set. Where pagination is possible, the `GroupInformation` fragment shall include all links defined in table 40 with the following exceptions:

- The "First" and "Previous" links shall be omitted from the first page.
- The "Next" and "Last" links shall be omitted from the last page.
- All links shall be omitted when the total number of search results is less than or equal to the maximum number of results per page (30).

The `GroupInformation@numOfItems` attribute shall indicate the total number of results across all pages within a Content Guide Server, however the value may not reflect the number of items visible to the user due to content compatibility or availability signalled in the Template XML AIT. For this reason, the DVB-I client shall not display the value of `GroupInformation@numOfItems` to the user.

The DVB-I client shall only request pages of results from a Content Guide Server as required for display to the user. Some requests can result in exceedingly large result sets (> 1 000 programmes) so the DVB-I client shall not pre-emptively request all pages from a Content Guide Server.

If the number of results visible to the user is less than the maximum number of results displayed within a screen of a DVB-I client's UI, and a Content Guide Server indicates a 'next' pagination link, the DVB-I client shall retrieve and display the next page of results from a Content Guide Server. The DVB-I client may pre-emptively request the next page to allow seamless display of results to the user.

When dealing with result pages, the DVB-I client shall obey retrieval rules as for other resources by observing the Cache-Control mechanisms defined in clause 4.3.2.1 and providing conditional request headers as defined in clause 4.3.2.2. 

NOTE: It is possible that there may be duplicate results provided, including but not limited to around paging boundaries. The DVB-I client should cater for this in their implementation. Duplicate results may be identified by the `ProgramInformation@programId` attribute. The total number of results for a given request may also change between paging operations as available content changes.

6.10 Metadata Profile

6.10.1 Schema Overview

6.10.1.1 Introduction

The DVB-I metadata profile is based on TV-Anytime and the Freeview Play specifications [1.11].

The set of TV-Anytime Metadata Description Fragments that may appear in a TV-Anytime XML instance document are specified in ETSI TS 102 822-3-1 [7]. The present document further profiles this set down to the following element types and their enclosing tables.

The DVB-I client may ignore any classification schemes, classification scheme terms, elements and attributes not specified within the present document in order to be robust to backwards-compatible changes to the API.

The ordering of elements used in the examples provided within the present document shall not be taken to be explicit unless specified within the corresponding schemas. The DVB-I client implementations shall be robust to alternate ordering of elements or inclusion of additional elements where allowed within the bounds of the schemas.
Figure 18: DVB-I TV-Anytime data structure overview

1. GroupInformationTable
   - GroupInformation fragment (schema type: GroupInformationType)
2. ProgramInformationTable
   - ProgramInformation fragment (schema type: ProgramInformationType)
3. ProgramLocationTable
   - Schedule fragment (schema type: ScheduleType)
   - ScheduleEvent fragment (schema type: ScheduleEventType)
   - OnDemandProgram fragment (schema type: OnDemandProgramType)

Other tables or fragment types not listed by this TV-Anytime profile may be ignored by the client. Content guide providers should not expect a client to process and display other metadata not listed in this profile. Clients shall be robust to the presence of other valid TV-Anytime metadata not listed in this profile.

6.10.1.2 Language Information

TV-Anytime requires that the default language used in a TV-Anytime document is specified at the top level with the TVAMain element using the @xml:lang attribute. The normal rules for scoping @xml:lang, and cascading to sub-elements applies. A TV-Anytime document, ETSI TS 102 822-3-1 [7], may contain text fields in multiple languages. The cardinality of any text element given in this metadata profile only refers to a single language. For example, multiple Title elements may exist within ProgramInformation.BasicDescription, each with @type="main" but with different @xml:lang values.
6.10.2 Void

6.10.3 Table Syntax

In the following tables each element/attribute is provided with a Mandatory/Optional value in the "Required" column indicating whether it shall or may be included in the data returned from a Content Guide Server.

Cardinality information is also included in the "Required" column in curly braces (e.g. {0..1}), specifying how many times this element/attribute may appear. In cases where the upper limit is unbounded the letter "n" is used to indicate an undefined positive integer. For text elements that contain a @xml:lang attribute the cardinality applies to a single language only. Multiple languages can be specified.

Individual elements within common tables that are only relevant in specific cases are identified by the inclusion of information in square braces below the element/attribute name e.g. [Schedules].

6.10.4 ProgramInformation Element

Table 41: ProgramInformation Element

<table>
<thead>
<tr>
<th>Element Name/ Required</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>@programId Mandatory (1)</td>
<td>The CRID of the programme. See note.</td>
</tr>
<tr>
<td>BasicDescription Mandatory (1)</td>
<td>Complex type describing the ProgramInformation. See clause 6.10.5 for further information.</td>
</tr>
<tr>
<td>OtherIdentifier Optional (0..n)</td>
<td>A code that can be used in addition to the CRID to identify a piece of content (e.g. an ISAN to identify a piece of content or an episode or a version thereof) as different CRIDs can be allocated to identical content. This element shall not be present in More Episodes responses.</td>
</tr>
<tr>
<td>MemberOf Optional (0..n)</td>
<td>In the Schedules response this may indicate group association. For the Now/Next Filtered Schedules response, the @crid shall indicate whether the event is currently on-air, in the future or in the past, by being a transitory member of the structural groups described in clause 6.5.3. For the More Episodes response, the @crid shall indicate the results group in the GroupInformationTable. The @index attribute defines the programme's position within the list defined by @crid and shall be an integer of 0 or greater. The @xsi:type attribute shall always be set to MemberOfType.</td>
</tr>
<tr>
<td>EpisodeOf Optional (0..n)</td>
<td>Indicates a groupId of a Box Set List from which the current programme is an episode.</td>
</tr>
</tbody>
</table>

NOTE: As described in clause 6.5.4, the CRID may change value as Content Providers supply enhanced metadata to override the original broadcast EIT metadata.
6.10.5 BasicDescription Elements

6.10.5.1 Introduction

The BasicDescription element is used in a number of locations and the included metadata is different depending on context. The variations are therefore displayed in individual subsections below; the applicable endpoint is indicated in square [ ] brackets.

6.10.5.2 ProgramInformation.BasicDescription Element [Schedules]

Table 42: ProgramInformation.BasicDescription Element [Schedules]

<table>
<thead>
<tr>
<th>Element Name/ Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>The title to describe the content.</td>
<td>&lt;Title type=&quot;main&quot;&gt;Bargain Hunt&lt;/Title&gt;</td>
</tr>
<tr>
<td></td>
<td>A Title element with @type attribute set to main is mandatory.</td>
<td>&lt;Title type=&quot;main&quot; xml:lang=&quot;de&quot;&gt;Schnäppchenjagd&lt;/Title&gt;</td>
</tr>
<tr>
<td></td>
<td>A second Title element with @type attribute set to secondary is optional.</td>
<td>&lt;Title type=&quot;secondary&quot;&gt;01/01/2014&lt;/Title&gt;</td>
</tr>
<tr>
<td></td>
<td>The character length shall not exceed 80 characters for either.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See note.</td>
<td></td>
</tr>
<tr>
<td>Synopsis</td>
<td>Descriptive text about the entity.</td>
<td>&lt;Synopsis length=&quot;short&quot;&gt;Amanda helps three homeowners in Wokingham.</td>
</tr>
<tr>
<td></td>
<td>The @length attribute shall be mandatory.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The possible values of this enumerated attribute are as follows:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• short - the length of the synopsis shall not exceed 90 characters.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• medium - the length of the synopsis shall not exceed 250 characters.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A minimum of one synopsis shall be provided and this shall have the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the @length attribute of medium. Additionally, a synopsis of length</td>
<td></td>
</tr>
<tr>
<td></td>
<td>short may optionally be provided.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There shall not be more than one synopsis element with the same @length</td>
<td></td>
</tr>
<tr>
<td></td>
<td>attribute for a specified language.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See note.</td>
<td></td>
</tr>
<tr>
<td>Genre</td>
<td>The genre or classification for the programme.</td>
<td>&lt;Genre href=&quot;urn:dvb:metadat:a:cs:ContentSubject:2019:4&quot; type=&quot;main&quot;/&gt;</td>
</tr>
<tr>
<td>Optional (0..1)</td>
<td>Possible values are taken from:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ContentCS defined in ETSI TS 102 822-3-1 [7]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• FormatCS defined in ETSI TS 102 822-3-1 [7]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ContentSubject defined in clause D.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The @type attribute shall always contain the value of main as the primary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>instance. The @type attribute shall not permit the value of secondary or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>other. The DVB-I client shall be robust to handling the addition of Genre</td>
<td></td>
</tr>
<tr>
<td></td>
<td>elements in future by using the term given in the @href attribute.</td>
<td></td>
</tr>
<tr>
<td>Element Name/Required</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>ParentalGuidance</td>
<td>The minimum age rating or guidance/watershed indicators and optional text. When ParentalGuidance is defined, a ParentalGuidance element with a minimum age rating shall always be provided. An additional ParentalGuidance element with guidance/watershed indicators and optional text may be provided.</td>
<td>See clause 6.10.15</td>
</tr>
<tr>
<td>Optional {0..2} per country ParentalGuidance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>An image related to the content. A maximum of one RelatedMaterial element identifying an image shall be specified - see clauses 5.2.8.2.1 and 6.10.13 for further information. Elements with HowRelated@href values that do not refer to an image shall be ignored. The DVB-I client shall be robust to handling the addition of RelatedMaterial elements in future by using the term given in RelatedMaterial.HowRelated@href attribute.</td>
<td>See clause 6.10.13</td>
</tr>
<tr>
<td>Optional {0..1} RelatedMaterial</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: This field may contain UTF-8 encoded characters and/or HTML character entity references as defined in clause 8.5 of W3C HTML 5.1 [29].

6.10.5.3 ProgramInformation.BasicDescription Element [Detailed Programme Information]

Table 43: ProgramInformation.BasicDescription Element [Detailed Programme Information]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>The title to describe the content. A Title element with @type attribute set to main is mandatory. A second Title element with @type attribute set to secondary is optional. The character length shall not exceed 80 characters for either. See note.</td>
<td>&lt;Title type=&quot;main&quot;&gt;Bargain Hunt&lt;/Title&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Title type=&quot;main&quot; xml:lang=&quot;de&quot;&gt;Schnäppchenjagd&lt;/Title&gt;</td>
</tr>
<tr>
<td>Element Name/ Required</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| Synopsis Mandatory {1..3} per language | Descriptive text about the entity. The @length attribute shall be mandatory. The possible values of this enumerated attribute are as follows: - short - the length of the synopsis shall not exceed 90 characters. - medium - the length of the synopsis shall not exceed 250 characters. - long - the length of the synopsis shall not exceed 1 200 characters. A minimum of one synopsis shall be provided and this shall have the @length attribute of medium. Additionally, one each of short and/or long may optionally also be provided. There shall not be more than one synopsis element with the same @length attribute. See note. | <Synopsis length="short">Amanda helps three homeowners in Wokingham. </Synopsis>  
Amanda helps three homeowners in Wokingham. Can Raj and Maria fix their decking? Margaret’s red and white interior could do with some maintenance. And can Bob and Geraldine update their home? </Synopsis>  
Amanda helps three homeowners in Wokingham. Can Raj and Maria fix their decking? Margaret’s red and white interior could do with some maintenance. And can Bob and Geraldine update their home? </Synopsis>  
Amanda helps three homeowners in Wokingham. Can Raj and Maria fix their decking? Margaret’s red and white interior could do with some maintenance. And can Bob and Geraldine update their home? </Synopsis> |
| Keyword Optional {0..20} per language | A keyword associated to a programme. Each individual keyword is provided in a separate element, although keywords may contain spaces. The character length of any Keyword shall not exceed 32 characters. The @type attribute on the Keyword element shall carry the value of main unless it is an editorial label, in which case a value of other shall be carried. The maximum number of Keyword elements that may be specified is 20. | <Keyword>FAMILY LIFE</Keyword>  
<Keyword>RELATIONSHIPS</Keyword> |
| Genre Optional {0..1} | The genre or classification for the programme. A genre that characterizes the programming on the service. Possible values are taken from: - ContentCS defined in ETSI TS 102 822-3-1 [7] - FormatCS defined in ETSI TS 102 822-3-1 [7] - ContentSubject defined in clause D.5 The @type attribute shall always contain the value of main as the primary instance. The @type attribute shall not permit the value of secondary or other. The DVB-I client shall be robust to handling the addition of Genre elements in future by checking the term given in the @href attribute and ignoring those that are not described in the present document. | <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:4" type="main"/> |
### Table 44: ProgramInformation.BasicDescription Element [Box Set Contents]

<table>
<thead>
<tr>
<th>Element Name/ Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>The title to describe the content. A Title element with @type attribute set to main is mandatory. A second Title element with @type attribute set to secondary is optional. The character length shall not exceed 80 characters for either. See note.</td>
<td><code>&lt;Title type=&quot;main&quot;&gt;Bargain Hunt&lt;/Title&gt;</code>&lt;br&gt;<code>&lt;Title type=&quot;main&quot; xml:lang=&quot;de&quot;&gt;Schnäppchenjagd&lt;/Title&gt;</code>&lt;br&gt;<code>&lt;Title type=&quot;secondary&quot;&gt;01/01/2014&lt;/Title&gt;</code></td>
</tr>
<tr>
<td>Synopsis</td>
<td>Descriptive text about the entity. The @length attribute shall be mandatory. The possible value of this enumerated attribute is as follows:  - medium - the length of the synopsis shall not exceed 250 characters. See note.</td>
<td><code>&lt;Synopsis length=&quot;medium&quot;&gt;Amanda helps three homeowners in Wokingham. Can Raj and Maria fix their decking? Margaret's red and white interior could do with some maintenance. And can Bob and Geraldine update their home?&lt;/Synopsis&gt;</code></td>
</tr>
<tr>
<td>ParentalGuidance</td>
<td>The minimum age rating or guidance/watershed indicators and optional text. When ParentalGuidance is defined, a ParentalGuidance element with a minimum age rating shall always be provided. An additional ParentalGuidance element with guidance/watershed indicators and optional text may be provided.</td>
<td>See clause 6.10.15</td>
</tr>
</tbody>
</table>
rating shall always be provided. An additional ParentalGuidance element with guidance/watershed indicators and optional text may be provided.

<table>
<thead>
<tr>
<th>RelatedMaterial</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional {0..1}</td>
<td>An image related to the content. A maximum of one RelatedMaterial element identifying an image shall be specified - see clauses 5.2.8.2.1 and 6.10.13 for further information. Elements with HowRelated@href values that do not refer to an image shall be ignored. The DVB-I client shall be robust to handling the addition of RelatedMaterial elements in future by checking the term given in RelatedMaterial.HowRelated@href attribute and ignoring those that are not described in the present document.</td>
<td>See clause 6.10.13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RelatedMaterial</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional {0, 2, 4}</td>
<td>A link to a relative page of results. There may be up to 4, depending on the current page. See clause 6.9 for further details.</td>
<td>See clause 6.10.13</td>
</tr>
</tbody>
</table>

NOTE: This field may contain UTF-8 encoded characters and/or HTML character entity references as defined in clause 8.5 of W3C HTML 5.1 [29].

### 6.10.5.5 ProgramInformation.BasicDescription Element [More Episodes]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong> Mandatory {1..2} per language</td>
<td>A label identifying the name of the Box Set. A Title element with @type attribute set to main is mandatory. A second Title element with @type attribute set to secondary is optional. The character length shall not exceed 80 characters for either. See note.</td>
<td><code>&lt;Title type=&quot;main&quot;&gt;Bargain Hunt&lt;/Title&gt;</code>&lt;br&gt;<code>&lt;Title type=&quot;main&quot; xml:lang=&quot;de&quot;&gt;Schnäppchenjagd&lt;/Title&gt;</code>&lt;br&gt;<code>&lt;Title type=&quot;secondary&quot;&gt;01/01/2014&lt;/Title&gt;</code></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RelatedMaterial</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional {0..1}</td>
<td>An image related to the content. A maximum of one RelatedMaterial element identifying an image shall be specified - see clauses 5.2.8.2.1 and 6.10.13 for further information. Elements with HowRelated@href values that do not refer to an image shall be ignored. The DVB-I client shall be robust to handling the addition of RelatedMaterial elements in future by checking the term given in RelatedMaterial.HowRelated@href attribute and ignoring those that are not described in the present document.</td>
<td>See clause 6.10.13.</td>
</tr>
</tbody>
</table>

NOTE: This field may contain UTF-8 encoded characters and/or HTML character entity references as defined in clause 8.5 of W3C HTML 5.1 [29].
### 6.10.5.6 GroupInformation.BasicDescription Element [Box Set List, Box Set Contents]

Table 46: GroupInformation.BasicDescription Element [Box Set Lists, Box Set Contents]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong> Mandatory {1} per language</td>
<td>A label identifying the name of the Box Set. The @type attribute shall only carry a value of main. The character length of the Title shall not exceed 80 characters.</td>
<td><code>&lt;Title type=&quot;main&quot;&gt;The Best of Roland Rat&lt;/Title&gt;</code></td>
</tr>
<tr>
<td><strong>Synopsis</strong> Mandatory {1} per language</td>
<td>Describes the content of the Box Set. The @length attribute shall be mandatory. The possible value of this enumerated attribute is as follows: • medium - the length of the synopsis shall not exceed 250 characters.</td>
<td><code>&lt;Synopsis length=&quot;medium&quot;&gt; Showcasing the amazing talents of the rodent superstar.&lt;/Synopsis&gt;</code></td>
</tr>
<tr>
<td><strong>Keyword</strong> Optional {0..20} per language</td>
<td>A keyword associated with a Box Set. Each individual keyword is provided in a separate element, although keywords may contain spaces. The character length of any Keyword shall not exceed 32 characters. The @type attribute on the Keyword element shall carry the value of main unless it is an editorial label, in which case a value of other shall be carried. The maximum number of Keyword elements that may be specified is 20.</td>
<td><code>&lt;Keyword&gt;FAMILY LIFE&lt;/Keyword&gt;</code> <code>&lt;Keyword&gt;RELATIONSHIPS&lt;/Keyword&gt;</code></td>
</tr>
<tr>
<td><strong>RelatedMaterial for image</strong> Optional {0..1}</td>
<td>Defines the image of the Box Set. A maximum of one RelatedMaterial element identifying an image shall be specified - see clauses 5.2.8 and 6.10.13 for further information. Elements with HowRelated values that do not refer to an image shall be ignored. Client devices shall be robust to handling the addition of RelatedMaterial elements in future by using the term given in RelatedMaterial.HowRelated@href attribute.</td>
<td>See clause 6.10.13.</td>
</tr>
<tr>
<td><strong>RelatedMaterial for Template AIT</strong> Mandatory {1}</td>
<td>A Template AIT for the Box Set to determine device compatibility. This shall have a RelatedMaterial.HowRelated@href attribute of urn:fvc:metadata:cs:HowRelatedCS:2018:templateAIT</td>
<td>See clause 6.10.13.</td>
</tr>
<tr>
<td><strong>RelatedMaterial for pagination</strong> Optional {0, 2, 4}</td>
<td>A link to a relative page of results. There may be up to 4, depending on the current page. See clause 6.9 for further details.</td>
<td>See clause 6.10.13.</td>
</tr>
</tbody>
</table>

NOTE: This field may contain UTF-8 encoded characters and/or HTML character entity references as defined in clause 8.5 of W3C HTML 5.1 [29].

### 6.10.5.7 GroupInformation.BasicDescription Element [More Episodes]

Table 47: GroupInformation.BasicDescription Element [More Episodes]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RelatedMaterial for pagination</strong> Optional {0, 2, 4}</td>
<td>A link to a relative page of results. There may be up to 4, depending on the current page. See clause 6.9 for further details.</td>
<td>See clause 6.10.13 for further details.</td>
</tr>
</tbody>
</table>
6.10.5.8 GroupInformation.BasicDescription Element [Box Set Categories]

Table 48: GroupInformation.BasicDescription Element [Box Set Categories - parent category]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>A label identifying the name of the Box Set. The @type attribute shall only carry a value of main. The character length of the Title shall not exceed 80 characters.</td>
<td>&lt;Title type=&quot;main&quot;&gt;The Best of Roland Rat&lt;/Title&gt;</td>
</tr>
<tr>
<td>RelatedMaterial for pagination</td>
<td>A link to a relative page of results. There may be up to 4, depending on the current page. See clause 6.9 for further details.</td>
<td>See clause 6.10.13</td>
</tr>
</tbody>
</table>

Table 49: GroupInformation.BasicDescription Element [Box Set Categories - child categories]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>A label identifying the name of the Box Set. The @type attribute shall only carry a value of main. The character length of the Title shall not exceed 80 characters.</td>
<td>&lt;Title type=&quot;main&quot;&gt;The Best of Roland Rat&lt;/Title&gt;</td>
</tr>
</tbody>
</table>
| Synopsis              | Describes the content of the Box Set Category. The @length attribute shall be mandatory. The possible value of this enumerated attribute is as follows:  
  • short - the length of the synopsis shall not exceed 90 characters.
  See note. | <Synopsis length="short">Showcasing the amazing talents of the rodent superstar.</Synopsis> |
| Genre                 | Specifies the classification of a box set category. The @type attribute shall always contain the value of main as the primary instance. The value for the @href attribute shall be taken from ContentSubject classification scheme in clause D.5. | <Genre href="urn:dvb:metadata:cs:ContentSubject:2019:5.0" type="main"/> |
| RelatedMaterial for image | Defines the image of the Box Set. A maximum of one RelatedMaterial element identifying an image shall be specified - see clauses 5.2.8 and 6.10.13 for further information. Elements with HowRelated attributes that do not refer to an image shall be ignored. Client devices shall be robust to handling the addition of RelatedMaterial elements in future by using the term given in RelatedMaterial.HowRelated@href attribute. | See clause 6.10.13. |

NOTE: This field may contain UTF-8 encoded characters and/or HTML character entity references as defined in clause 8.5 of W3C HTML 5.1 [29].

6.10.6 Schedule Element

The Schedule element provides an envelope for a number of individual ScheduleEvent elements associated with a single service. The attributes of the Schedule element provide information on which service the schedule is associated with and the period covered.
Table 50: Schedule Element

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>@serviceIDRef Mandatory (1)</td>
<td>It shall match UniqueIdentifier or ContentGuideServiceRef in the Service element (see clause 5.5.2) used in the sid[] query parameter of the request.</td>
<td><code>&lt;Schedule serviceIDRef=&quot;tag:rai.it,2019:rai-3&quot; start=&quot;2013-09-25T11:15:00Z&quot; end=&quot;2013-09-25T12:30:00.000Z&quot;/&gt;</code></td>
</tr>
<tr>
<td>@start Mandatory (1)</td>
<td>Specifies the start time of the earliest ScheduleEvent within the provided schedule which may be later than the start time specified in the request. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19].</td>
<td><code>&lt;Schedule serviceIDRef=&quot;tag:rai.it,2019:rai-3&quot; start=&quot;2013-09-25T11:15:00Z&quot; end=&quot;2013-09-25T12:30:00.000Z&quot;/&gt;</code></td>
</tr>
<tr>
<td>@end Mandatory (1)</td>
<td>Specifies the end time of the latest ScheduleEvent within the provided schedule which may be later than the end time specified in the request. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19].</td>
<td><code>&lt;Schedule serviceIDRef=&quot;tag:rai.it,2019:rai-3&quot; start=&quot;2013-09-25T11:15:00Z&quot; end=&quot;2013-09-25T12:30:00.000Z&quot;/&gt;</code></td>
</tr>
<tr>
<td>ScheduleEvent Optional (0..n)</td>
<td>Individual ScheduleEvent elements are contained within the schedule wrapper. See clause 6.10.7 for details of the ScheduleEvent element.</td>
<td>See clause 6.10.7.</td>
</tr>
</tbody>
</table>

6.10.7 ScheduleEvent Element

Multiple ScheduleEvent elements are wrapped within a Schedule element, with a Schedule element per service in Schedule endpoint responses. Each ScheduleEvent element identifies an individual programme within the schedule period and there may be gaps in the schedule.

Table 51: ScheduleEvent Element

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Mandatory (1)</td>
<td>Specifies the CRID of the matching ProgramInformation@programId attribute.</td>
<td><code>&lt;Program crid=&quot;crid://www.channel7.com/version/57984/005/V&quot;/&gt;</code></td>
</tr>
<tr>
<td>ProgramURL Optional (0..1)</td>
<td>Contains a DVB locator as specified in clause 6.4.2 of ETSI TS 102 851 [16] containing only a DVB service URL and event_id, but no time duration, in the following hexadecimal format: <code>dvb://&lt;original_network_id&gt;..&lt;service_id&gt;;&lt;event_id&gt;</code> This locator specifies the event that the Schedule Event relates to. This may be used to match events present within the EIT data where a schedule represents a DVB-C/S/T service.</td>
<td><code>&lt;ProgramURL&gt;dvb://233a..1044;c3bf&lt;/ProgramURL&gt;</code></td>
</tr>
<tr>
<td>InstanceDescription Optional (0..1)</td>
<td>Indicates the audio/video attributes of the programme including access services. See clauses 6.10.9, 6.10.16 and 4.5 for more information.</td>
<td>See clauses 6.10.9, 6.10.16 and 4.5.</td>
</tr>
<tr>
<td>Element Name/ Required</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PublishedStartTime</td>
<td>Mandatory {1}</td>
<td>&lt;PublishedStartTime&gt;2014-07-15T20:42:40Z&lt;/PublishedStartTime&gt;</td>
</tr>
<tr>
<td>PublishedDuration</td>
<td>Mandatory {1}</td>
<td>&lt;PublishedDuration&gt;PT1H00M00S&lt;/PublishedDuration&gt;</td>
</tr>
<tr>
<td>ActualStartTime</td>
<td>Optional {0..1}</td>
<td>&lt;ActualStartTime&gt;2014-07-15T20:42:30Z&lt;/ActualStartTime&gt;</td>
</tr>
<tr>
<td>ActualDuration</td>
<td>Optional {0..1}</td>
<td>&lt;ActualDuration&gt;PT1H00M03S&lt;/ActualDuration&gt;</td>
</tr>
<tr>
<td>FirstShowing</td>
<td>Optional {0..1}</td>
<td>&lt;FirstShowing value=&quot;false&quot; /&gt;</td>
</tr>
<tr>
<td>Free</td>
<td>Optional {0..1}</td>
<td>&lt;Free value=&quot;true&quot;/&gt;</td>
</tr>
</tbody>
</table>
6.10.8 OnDemandProgram Element

6.10.8.1 Introduction

The OnDemandProgram element is used in a number of locations and the included metadata is different depending on context. The variations are therefore displayed in individual subsections below; the applicable endpoint is indicated in square [ ] brackets.

6.10.8.2 OnDemandProgram Element [Schedules, Detailed Programme Information]

Table 52: OnDemandProgram Element [Schedules, Detailed Programme Information]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>@serviceIDRef</td>
<td>Mandatory {1}</td>
<td>It shall match UniqueIdentifier or ContentGuideServiceRef in the Service element (see clause 5.5.2) as provided in the sid[] query parameter of the request.</td>
</tr>
<tr>
<td>Program</td>
<td>Mandatory (1)</td>
<td>Specifies the CRID of the matching ProgramInformation@programId attribute.</td>
</tr>
<tr>
<td>ProgramURL</td>
<td>Mandatory (1)</td>
<td>A URL location of a content deep-linked XML AIT for the on-demand programme. The XML AIT shall be used to launch the on-demand player. Please see clause 5.2.4 for the format of the XML AIT content and information on how the DVB-I client shall append contextual parameters. The @contentType attribute of the element shall carry the value application/vnd.dvb.ait+xml.</td>
</tr>
<tr>
<td>AuxiliaryURL</td>
<td>Optional {0..1}</td>
<td>A URL location of a Template XML AIT that can be used to determine whether the content instance specified by ProgramURL is compatible with the device. Please see clause 5.2.4 for the format and usage of the Template XML AIT. The @contentType attribute of the element shall carry the value application/vnd.dvb.ait+xml.</td>
</tr>
<tr>
<td>InstanceDescription</td>
<td>Mandatory {1}</td>
<td>Used for indicating media asset availability and audio/video attributes - see clause 6.10.16.</td>
</tr>
<tr>
<td>PublishedDuration</td>
<td>Mandatory {1}</td>
<td>The advertised duration of the On Demand programme which will typically be different from the actual exact duration. The format shall adhere to clause 5.3.3.2 of ISO 8601-1 [19]. Partial representations are also permitted.</td>
</tr>
<tr>
<td>StartOfAvailability</td>
<td>Mandatory {1}</td>
<td>The time and date that this programme will first be available for on-demand viewing. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19]. Where relevant, broadcast mechanisms such as the Time Offset Table (TOT) shall be used to adjust all Content Guide Server-provided timestamps to local time.</td>
</tr>
</tbody>
</table>
## 6.10.8.3 OnDemandProgram Element [More Episodes]

### Table 53: OnDemandProgram Element [More Episodes]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>EndOfAvailability</td>
<td>The time and date that this programme will no longer be available for on-demand viewing. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19]. Where relevant, broadcast mechanisms such as the Time Offset Table (TOT) shall be used to adjust all Content Guide Server-provided timestamps to local time.</td>
<td><code>&lt;EndOfAvailability&gt;2014-04-17T21:00:00Z&lt;/EndOfAvailability&gt;</code></td>
</tr>
<tr>
<td>DeliveryMode</td>
<td>Indicates the delivery mode and shall contain the value streaming.</td>
<td><code>&lt;DeliveryMode&gt;streaming&lt;/DeliveryMode&gt;</code></td>
</tr>
<tr>
<td>Free</td>
<td>Indicates if access to this instance of the programme is free. The @value attribute is mandatory and shall be true or false.</td>
<td><code>&lt;Free value=&quot;true&quot;/&gt;</code></td>
</tr>
<tr>
<td>@serviceIDRef</td>
<td>It shall match UniqueIdentifier or ContentGuideServiceRef in the Service element (see clause 5.5.2) as provided in the sid[] query parameter of the request. The ServiceInstance element of Service element may be used to provide DVB-I Content guide for a linear broadcast channel.</td>
<td><code>&lt;OnDemandProgram serviceIDRef=&quot;http://channel7.co.uk/service_a_app&quot;&gt;</code></td>
</tr>
<tr>
<td>Program</td>
<td>Specifies the CRID of the matching Program information@programId attribute.</td>
<td><code>&lt;Program crid=&quot;crid://channel7.co.uk/n19alrr1&quot;/&gt;</code></td>
</tr>
<tr>
<td>ProgramURL</td>
<td>A URL location of a content deep-linked XML AIT for the on-demand programme. The XML AIT shall be used to launch the on-demand player. Please see clause 5.2.4 for the format of the XML AIT content and information on how the DVB-I client shall append contextual parameters. The @contentType attribute of the element shall carry the value application/vnd.dvb.ait+xml.</td>
<td><code>&lt;ProgramURL contentType=&quot;application/vnd.dvb.ait+xml&quot;&gt;https://broadcasteur.co.uk:8085/ait?pid=tb0101p3j&lt;/ProgramURL&gt;</code></td>
</tr>
<tr>
<td>AuxiliaryURL</td>
<td>A URL location of a Template XML AIT that can be used to determine whether the content instance specified by ProgramURL is compatible with the device. Please see clause 5.2.4 for the format and usage of the Template XML AIT. The @contentType attribute of the element shall carry the value application/vnd.dvb.ait+xml.</td>
<td><code>&lt;AuxiliaryURL contentType=&quot;application/vnd.dvb.ait+xml&quot;&gt;https://broadcasteur.co.uk:8085/ait?template&lt;/AuxiliaryURL&gt;</code></td>
</tr>
<tr>
<td>PublishedDuration</td>
<td>The advertised duration of the On Demand programme which will typically be different from the actual exact duration. The format shall adhere to clause 5.3.3.2 of ISO 8601-1 [19]. Partial representations are also permitted.</td>
<td><code>&lt;PublishedDuration&gt;PT1H00M00S&lt;/PublishedDuration&gt;</code></td>
</tr>
<tr>
<td>Element Name/Required</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>StartOfAvailability</td>
<td>The time and date that this programme will first be available for on-demand viewing. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19]. Where relevant, broadcast mechanisms such as the Time Offset Table (TOT) shall be used to adjust all Content Guide Server-provided timestamps to local time.</td>
<td>&lt;StartOfAvailability&gt;2014-03-18T22:00:00Z&lt;/StartOfAvailability&gt;</td>
</tr>
<tr>
<td>EndOfAvailability</td>
<td>The time and date that this programme will no longer be available for on-demand viewing. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19]. Where relevant, broadcast mechanisms such as the Time Offset Table (TOT) shall be used to adjust all Content Guide Server-provided timestamps to local time.</td>
<td>&lt;EndOfAvailability&gt;2014-04-17T21:00:00Z&lt;/EndOfAvailability&gt;</td>
</tr>
<tr>
<td>Free</td>
<td>Indicates if access to this instance of the programme is free. The @value attribute is mandatory and shall be true or false.</td>
<td>&lt;Free value=&quot;true&quot;/&gt;</td>
</tr>
</tbody>
</table>

6.10.8.4 OnDemandProgram Element [Box Set Contents]

<table>
<thead>
<tr>
<th>Table 54: OnDemandProgram Element [Box Set Contents]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Element Name/ Required</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>@serviceIDRef</td>
</tr>
<tr>
<td>Program</td>
</tr>
</tbody>
</table>
| ProgramURL             | A URL location of a content deep-linked XML AIT for the on-demand programme. The XML AIT shall be used to launch the on-demand player. Please see clause 5.2.4 for the format of the XML AIT content and information on how the DVB-I client shall append contextual parameters. The @contentType attribute of the element shall carry the value application/vnd.dvb.aite+xml. | &lt;ProgramURL contentType="application/vnd.dvb.aite+xml ";
https://www.bbc.tv/apps.co.uk/ait/launch/launcher.aitx?deeplink=tv/playback/b00jd8gp&ProgramURL&gt; |
| AuxiliaryURL           | A URL location of a Template XML AIT that can be used to determine whether the content instance specified by ProgramURL is compatible with the device. Please see clause 5.2.4 for the format and usage of the Template XML AIT. The @contentType attribute of the element shall carry the value application/vnd.dvb.aite+xml. | &lt;AuxiliaryURL contentType="application/vnd.dvb.aite+xml ";
https://www.mybroadcaster.co.uk/ait/launch/launcher.aitx&AuxiliaryURL&gt; |
| InstanceDescription    | Indicates the audio/video attributes of the programme including access services. See clauses 6.10.9, 6.10.16 and 4.5 for more information.                                                                                                                      | See clauses 6.10.9, 6.10.16 and 4.5. |
### AVAttributes Element

**Table 55: AVAttributes Element**

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>PublishedDuration</td>
<td>The advertised duration of the On Demand programme which will typically be different from the actual exact duration. The format shall adhere to clause 5.3.3.2 of ISO 8601-1 [19]. Partial representations are also permitted.</td>
<td>&lt;PublishedDuration&gt;PT00H30M00S&lt;/PublishedDuration&gt;</td>
</tr>
<tr>
<td>StartOfAvailability</td>
<td>The time and date that this programme will first be available for on-demand viewing. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19]. Where relevant, broadcast mechanisms such as the Time Offset Table (TOT) shall be used to adjust all Content Guide Server-provided timestamps to local time.</td>
<td>&lt;StartOfAvailability&gt;2018-07-13T08:00:00Z&lt;/StartOfAvailability&gt;</td>
</tr>
<tr>
<td>EndOfAvailability</td>
<td>The time and date that this programme will no longer be available for on-demand viewing. Expressed in Coordinated Universal Time (UTC) with the Zulu designator and formatted according to clause 5.3.3 of ISO 8601-1 [19]. Where relevant, broadcast mechanisms such as the Time Offset Table (TOT) shall be used to adjust all Content Guide Server-provided timestamps to local time.</td>
<td>&lt;EndOfAvailability&gt;2019-01-12T09:00:00Z&lt;/EndOfAvailability&gt;</td>
</tr>
<tr>
<td>Free</td>
<td>Indicates if access to this instance of the programme is free. The @value attribute is mandatory and shall be &quot;true&quot; or &quot;false.&quot;</td>
<td>&lt;Free value=&quot;true&quot;/&gt;</td>
</tr>
</tbody>
</table>

**NOTE:** CaptioningAttributes is a legacy field defined in a former version of the present document and should not be used.
6.10.10 AudioAttributes Element

Table 56: AudioAttributes Element

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>MixType Optional {0..1}</td>
<td>The type of the audio mix. An item from the AudioPresentationCS vocabulary shall be assigned to the @href attribute of the element to indicate mono, stereo and 5.1. See clause 6.11.2.</td>
<td>&lt;MixType href=&quot;urn:mpeg:mpeg7:cs:AudioPresentationCS:2001:3&quot;/&gt;</td>
</tr>
<tr>
<td>AudioLanguage Optional {0..1}</td>
<td>An item from the AudioPurposeCS vocabulary shall be assigned to the @purpose attribute of the element. See clause 6.11.3 for allowable CS terms. This element should not indicate the presence of audio description. See clause 4.5 for further details.</td>
<td>&lt;AudioLanguage purpose=&quot;urn:tva:metadata:cs:AudioPurposeCS:2007:6&quot;&gt;en&lt;/AudioLanguage&gt;</td>
</tr>
</tbody>
</table>

6.10.11 VideoAttributes Element

Table 57: VideoAttributes Element

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>HorizontalSize Optional {0..1}</td>
<td>The horizontal size in pixels of the video. The value specified shall be used to determine SD/HD/4K/8K content descriptors. By default, content may be assumed to be SD resolution if this element is not present. To indicate that the content is HD resolution, 4K resolution or a resolution lower than SD, the HorizontalSize and VerticalSize elements shall be set to the appropriate values (e.g. 1920 and 1080 respectively for HD). The DVB-I client shall only use the VerticalSize to determine if a piece of content is SD, HD, 4K, etc.</td>
<td>&lt;!--SD --&gt; &lt;HorizontalSize&gt;576&lt;/HorizontalSize&gt; &lt;!--HD --&gt; &lt;HorizontalSize&gt;1920&lt;/HorizontalSize&gt;</td>
</tr>
<tr>
<td>VerticalSize Optional {0..1}</td>
<td>The vertical size in pixels of the video. The value specified shall be used to determine SD/HD/4K/8K content descriptors. By default, content may be assumed to be SD resolution if this element is not present. To indicate that the content is HD resolution, 4K resolution or a resolution lower than SD, the HorizontalSize and VerticalSize elements shall be set to the appropriate values (e.g. 1920 and 1080 respectively for HD). The DVB-I client shall only use the VerticalSize to determine if a piece of content is SD, HD, 4K, etc., with the following thresholds: • SD if &lt; 720 • HD if &gt;= 720 and &lt; 2160 • 4K if &gt;= 2160 and &lt; 4320 • 8K if &gt;= 4320</td>
<td>&lt;!--SD --&gt; &lt;VerticalSize&gt;512&lt;/VerticalSize&gt; &lt;!--HD --&gt; &lt;VerticalSize&gt;1080&lt;/VerticalSize&gt;</td>
</tr>
<tr>
<td>AspectRatio Optional {0..1}</td>
<td>The aspect ratio of the video.</td>
<td>&lt;AspectRatio&gt;16:9&lt;/AspectRatio&gt;</td>
</tr>
</tbody>
</table>
6.10.12 Void

Table 58: void

6.10.13 RelatedMaterial Element

Table 59: RelatedMaterial Element

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
</table>
| HowRelated Mandatory {1} | Describes the type of related material to the content. An item from the HowRelatedCS vocabulary shall be assigned to the @href attribute of the element. The @href attribute shall carry a value specified in clause D.1 where the RelatedMaterial fragment contains a link to an application, an application logo, service logo or programme image in the MediaLocator.MediaUri element. The @href attribute shall carry one of the values defined in clause 6.9 where links to other pages in a results set are returned. | <!-- Service Logo (Promotional Still image) -->
<!-- Programme Image (Promotional Still image) -->

| Format Optional {0..1} | Only the StillPictureFormat sub-element is permitted. | |
| MediaLocator Mandatory {1..n} | Specifies the location of the media asset or content. Defined as an MPEG-7 datatype, MediaLocatorType (see clause 6.5.2 of ISO/IEC 15938-5 [20] for a detailed description). Multiple images can be signalled where each has a MediaLocator element. At least one image shall be provided with the Media Type image/jpeg or image/png for compatibility purposes and other image formats including image/webp may be optionally provided. | <MediaLocator>
<MediaUri contentType="image/png">
https://www.channel7.com/channela/image.png</MediaUri>
</MediaLocator>

6.10.14 CreditsItem Element

A maximum of 40 CreditsItem elements shall be present within a CreditsList element.

NOTE: The default behaviour is to present the CreditsItem elements using the order they appear in the CreditsList element

CreditsItem elements shall be specified in one of the following ways:

- PersonName
- PersonName and Character
- OrganizationName
### Table 60: CreditsItem Element

<table>
<thead>
<tr>
<th>Element Name/ Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>@role Mandatory {1}</td>
<td>Identifies the type of credit that this CreditsItem relates to. The value shall be an item from either the RoleCS or TVARoleCS classification schemes. See clause 6.11.6 for allowed terms and the display text to use for each.</td>
<td><code>&lt;CreditsItem role=&quot;urn:mpeg:mpeg7:cs:RoleCS:2001:INTERVIEWER&quot;&gt;</code></td>
</tr>
<tr>
<td>PersonName Optional {0..1}</td>
<td>The name of the person. This element shall only be supplied if OrganizationName is not present.</td>
<td><code>&lt;PersonName&gt;</code></td>
</tr>
<tr>
<td>PersonName.mpeg7: GivenName Mandatory if PersonName present {1} per language</td>
<td>The name used to address the person or character - typically first name. The length of the text shall not exceed 32 characters. See note.</td>
<td><code>&lt;PersonName&gt;</code></td>
</tr>
<tr>
<td>PersonName.mpeg7: FamilyName Optional {0..1} per language</td>
<td>The surname of the person. The length of the text shall not exceed 32 characters. See note.</td>
<td><code>&lt;PersonName&gt;</code></td>
</tr>
<tr>
<td>Character Optional {0..1}</td>
<td>The name of the character. This element shall only be supplied if PersonName is also present.</td>
<td><code>&lt;Character&gt;</code></td>
</tr>
<tr>
<td>Character.mpeg7: GivenName Mandatory if Character present {1} per language</td>
<td>The name used to address the character - typically first name. The length of the text shall not exceed 32 characters. See note.</td>
<td><code>&lt;Character&gt;</code></td>
</tr>
<tr>
<td>Character.mpeg7: FamilyName Optional {0..1} per language</td>
<td>The surname of the character. The length of the text shall not exceed 32 characters. See note.</td>
<td><code>&lt;Character&gt;</code></td>
</tr>
<tr>
<td>OrganizationName Optional {0..1} per language</td>
<td>The name of an organization referenced in a CreditsItem. This element shall only be supplied if PersonName is not present. The length of the text shall not exceed 32 characters. See note.</td>
<td><code>&lt;OrganizationName&gt;</code></td>
</tr>
</tbody>
</table>

**NOTE:** This field may contain UTF-8 encoded characters and/or HTML character entity references as defined in clause 8.5 of W3C HTML 5.1 [29].

### 6.10.15 ParentalGuidance Element

Parental rating or guidance information provided in the programme metadata is used in the user interface when presenting and/or hiding parts of the electronic programme guide, selecting a service and presenting a programme within a service. The DVB-I client shall not permit playback of programmes that do not meet the parental rating or guidance criteria.

It is outside the scope of the present document whether a service is selectable that either

1) **not-applicable:** does not have any parental rating or guidance information in a scheme supported by the DVB-I client,
2) **not-available;** is known by the client not to have any available content guide metadata, or

3) **not-specified;** does not have any parental rating or guidance information in the content guide metadata provided.

The ability to select the service under these conditions is typically covered through regional legislation.

**NOTE:** It is recommended that a DVB-I client pre-caches content guide metadata for at least the current programme, in as many services as far as reasonably possible, to avoid needing to block or delay the selection of a service while waiting for content guide metadata.

### Table 61: ParentalGuidance Element

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>mpeg7:MinimumAge</td>
<td>Mandatory for the first ParentalGuidance element defined, this element shall indicate the minimum age required by the parental rating attributed to the content. In markets where age-based ratings are not used, the minimum age shall be set to a value of 255, which signals that a Content Rating classification scheme is required, and a classification-based term shall be provided in an additional ParentalGuidance element containing an mpeg7:ParentalRating element.</td>
<td><code>&lt;mpeg7:MinimumAge&gt;12&lt;/MinimumAge&gt;</code></td>
</tr>
<tr>
<td>ExplanatoryText</td>
<td>ExplanatoryText is mandatory if DTGContentWarningCS specified, otherwise optional (0..1) per language. Describes warnings within the programme e.g. Contains adult language and mature themes. There shall only be one element and a @length attribute shall be provided which will have the value long. The length limit is 160 characters. See note.</td>
<td><code>&lt;ExplanatoryText length=&quot;long&quot;&gt;Contains strong language and flash photography&lt;/ExplanatoryText&gt;</code></td>
</tr>
</tbody>
</table>
### Table 62: InstanceDescription Element

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional {0..1}</td>
<td>The @href attribute of the Genre element shall indicate the availability of Restart. See clauses 6.5.5 and 6.11.11 for further information.</td>
<td></td>
</tr>
<tr>
<td>Mandatory {2}</td>
<td>Whether an OnDemand asset may be shown available in a content guide. It indicates availability of the media asset and availability of on-demand programme in a forwards EPG. The possible values shall be taken from MediaAvailabilityCS and FEPGAvailabilityCS. The default values shall be media_unavailable and fepg_unavailable. See clauses 6.11.7 and 6.11.8 for information on how these indicators shall be used. The @type attribute shall carry the value other or may be omitted.</td>
<td></td>
</tr>
<tr>
<td>AVAttributes</td>
<td>The attributes of the audio, video, and access services provided by the media, e.g., subtitles and sign-language of this event or content.</td>
<td>See clauses 6.10.9 and 4.5.</td>
</tr>
<tr>
<td>Optional {0..1}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OtherIdentifier [ScheduleEvent]</td>
<td>The identifiers of schedule events including the programme CRID (@type=&quot;eit-programme-crid&quot;) and series CRID (@type=&quot;eit-series-crid&quot;) carried in broadcast EIT Content Identifier Descriptor(s) (see ETSI TS 102 323 28) as well as the identifier(s) of the content protection scheme(s) used for this scheduled event (@cpsIndex of the related content protection scheme(s) declared for the associated service in the service list).</td>
<td><code>&lt;OtherIdentifier type=&quot;eit-programme-crid&quot;&gt;crid://channel7.co.uk/5A795M&lt;/OtherIdentifier&gt;</code>, <code>&lt;OtherIdentifier type=&quot;eit-series-crid&quot;&gt;crid://channel7.co.uk/KCI4LM&lt;/OtherIdentifier&gt;</code></td>
</tr>
</tbody>
</table>
### Table 63: GroupInformation Element [Box Set Categories, Box Set Lists, Box Set Contents]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>@groupId</td>
<td>The CRID of the group. For Box Set Categories responses this shall represent the CRID of the parent group or a category group. For Box Set Lists and Box Set Contents responses this shall represent the CRID of the corresponding Box Set.</td>
<td><code>&lt;GroupInformation groupId=&quot;crid://duk.co.uk/search/results&quot; ordered=&quot;true&quot; numOfItems=&quot;47&quot;&gt;</code></td>
</tr>
<tr>
<td>@ordered</td>
<td>Defines whether the members of the group are ordered. This shall always be set to true. For Box Set Categories and Box Set Lists responses, this attribute shall not be present in GroupInformation elements except for the parent groups.</td>
<td><code>&lt;GroupInformation groupId=&quot;crid://duk.co.uk/search/results&quot; ordered=&quot;true&quot; numOfItems=&quot;47&quot;&gt;</code></td>
</tr>
<tr>
<td>@numOfItems</td>
<td>Defines the number of members within a group. This value shall define the total number of items, not the number present on the current page. The value shall always be set to 0 or a positive integer. For Box Set Categories and Box Set Lists responses, this attribute shall not be present in GroupInformation elements except for the parent groups.</td>
<td><code>&lt;GroupInformation groupId=&quot;crid://duk.co.uk/search/results&quot; ordered=&quot;true&quot; numOfItems=&quot;47&quot;&gt;</code></td>
</tr>
<tr>
<td>Element Name/Required</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>@serviceIDRef</td>
<td>In Box Set Lists and Box Set Contents responses, the service identifier of the service to which the Box Set relates (either UniqueIdentifier or ContentGuideServiceRef). This shall not be present in responses other than Box Set Lists and Box Set Contents.</td>
<td>&lt;OnDemandProgram serviceIDRef=&quot;http://www.channel7.com/services/dtt/ChannelA/London&quot;/&gt;</td>
</tr>
<tr>
<td>GroupType</td>
<td>The @xsi:type attribute shall always be ProgramGroupTypeType. The @value attribute shall always have the value otherCollection.</td>
<td>&lt;GroupType xsi:type=&quot;ProgramGroupTypeType&quot; value=&quot;otherCollection&quot;/&gt;</td>
</tr>
<tr>
<td>BasicDescription</td>
<td>Contains a number of RelatedMaterial elements for page links (see clause 6.10.5), in which case this element shall only be present where there is more than one page of results. For Box Set Categories, the value contains metadata related to each category. For Box Set Lists, the value shall contain metadata related to each individual Box Set, except for the parent group of the Box Set Lists response, for which the value shall contain the title of the selected category, in addition to a number of RelatedMaterial elements for page links (see clause 6.10.5) when there is more than one page of results.</td>
<td>&lt;BasicDescription&gt; &lt;RelatedMaterial&gt; &lt;HowRelated href=... /&gt; &lt;/RelatedMaterial&gt; &lt;/BasicDescription&gt;</td>
</tr>
<tr>
<td>MemberOf</td>
<td>For non-parent groups in Box Set Lists and Box Set Categories responses, identifies the category group to which the box set is a part of. The @index attribute denotes the box set’s position within the category. The @xsi:type attribute shall always be set to MemberOfType.</td>
<td>&lt;MemberOf xsi:type=&quot;MemberOfTyp e&quot; index=&quot;1&quot; crid=&quot;crid://dvb.org/metadata/collections/boxsets/categories&quot;/&gt;</td>
</tr>
</tbody>
</table>
6.10.17.3  GroupInformation Element [Now/Next Filtered Schedules]

Table 64: GroupInformation Element [Now/Next Filtered Schedules]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>@groupId</td>
<td>The CRID of the group, identifying whether the group represents the current, future or previous events. This shall be one of: • crid://dvb.org/metadata/schedules/now-next/now • crid://dvb.org/metadata/schedules/now-next/later • crid://dvb.org/metadata/schedules/now-next/earlier</td>
<td>&lt;GroupInformation groupId=&quot;crid://dvb.org/metadata/schedules/now-next/now&quot; ordered=&quot;true&quot; numOfItems=&quot;1&quot;/&gt;</td>
</tr>
<tr>
<td>@ordered</td>
<td>Defines whether the members of the group are ordered. This shall always be set to true.</td>
<td></td>
</tr>
<tr>
<td>@numOfItems</td>
<td>Defines the number of members within a group.</td>
<td></td>
</tr>
<tr>
<td>GroupType</td>
<td>The @xsi:type attribute shall always be ProgramGroupTypeType. The @value attribute shall always have the value otherCollection.</td>
<td>&lt;GroupType xsi:type=&quot;ProgramGroupTypeType&quot; value=&quot;otherCollection&quot;/&gt;</td>
</tr>
<tr>
<td>BasicDescription</td>
<td>Not used, the BasicDescription element shall be present but empty.</td>
<td>&lt;BasicDescription/&gt;</td>
</tr>
</tbody>
</table>

6.10.17.4  GroupInformation Element [More Episodes]

Table 65: GroupInformation Element [More Episodes]

<table>
<thead>
<tr>
<th>Element Name/Required</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>@groupId</td>
<td>The CRID of the results group, identifying that the group represents the response to a More Episodes request.</td>
<td>&lt;GroupInformation groupId=&quot;crid://mdata.co.uk/more-episodes/results&quot; ordered=&quot;true&quot; numOfItems=&quot;115&quot;/&gt;</td>
</tr>
<tr>
<td>@ordered</td>
<td>Defines whether the members of the group are ordered. This shall always be set to true.</td>
<td></td>
</tr>
<tr>
<td>@numOfItems</td>
<td>Defines the total number of members within a group.</td>
<td></td>
</tr>
<tr>
<td>GroupType</td>
<td>The @xsi:type attribute shall always be ProgramGroupTypeType. The @value attribute shall always have the value otherCollection.</td>
<td>&lt;GroupType xsi:type=&quot;ProgramGroupTypeType&quot; value=&quot;otherCollection&quot;/&gt;</td>
</tr>
<tr>
<td>BasicDescription</td>
<td>Contains a number of RelatedMaterial elements for page links (see clause 6.10.5), in which case this element shall only be present where there is more than one page of results.</td>
<td>See clause 6.10.5.7 for further details.</td>
</tr>
</tbody>
</table>
6.11 Classification Terms

6.11.1 Introduction

This clause details the Classification Scheme (CS) terms used for the DVB-I content guide. The CS terms are profiled from MPEG-7 as defined in ISO/IEC 15938-5 [20], TV-Anytime as defined in ETSI TS 102 822-3-1 [7] and the Freeview Play specification [i.11].

6.11.2 Audio Mix Types

The values identified in Table 66 are profiled from MPEG-7, ISO/IEC 15938-5 [20].

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>.../InstanceDescription/AVAttributes/AudioAttributes/MixType[@href]</td>
<td>urn:mpeg:mpeg7:cs:AudioPresentationCS:2001:2</td>
<td>Mono</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:AudioPresentationCS:2001:3</td>
<td>Stereo</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:AudioPresentationCS:2001:5</td>
<td>Home theatre 5.1</td>
</tr>
</tbody>
</table>

6.11.3 Audio Purpose

The values identified in Table 67 are profiled from TV-Anytime, ETSI TS 102 822-3-1 [7].

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
</table>

6.11.4 Void

Table 68: void

6.11.5 Content Genre

All values from the TV-Anytime ContentCS (urn:tva:metadata:cs:ContentCS:2011) or FormatCS (urn:tva:metadata:cs:FormatCS:2011) defined in ETSI TS 102 822-3-1 [7] or the DVB ContentSubject defined in clause D.5 are applicable.
6.11.6 Credit Role

The values identified in Table 69 are profiled from MPEG-7, ISO/IEC 15938-5 [20], and TV-Anytime, ETSI TS 102 822-3-1 [7].

Table 69: Credit Role

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>../../BasicDescription/CreditsList/CreditsItem[@role]</td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:ACTOR</td>
<td>Actor</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:AGGREGATOR</td>
<td>Aggregator</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:ANCHOR</td>
<td>Anchor</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:ANIMATOR</td>
<td>Animator</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:ART-DIRECTOR</td>
<td>Art Director</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:ASSISTANT-DIRECTOR</td>
<td>Assistant Director</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:AUTHOR</td>
<td>Author</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:BROADCASTER</td>
<td>Broadcaster</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:CAMERA-ASSISTANT</td>
<td>Camera Assistant</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:CAMERA-OPERATOR</td>
<td>Camera Operator</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:COMPOSER</td>
<td>Composer</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:CONTINUITY-PERSON</td>
<td>Continuity Person</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:COSTUMER</td>
<td>Costumer</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:COSTUME-SUPERVISOR</td>
<td>Costume Supervisor</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:DANCER</td>
<td>Dancer</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:DIRECTOR</td>
<td>Director</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:DISSEMINATOR</td>
<td>Disseminator</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:DISTRIBUTOR</td>
<td>Distributor</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:EXECUTIVE-PRODUCER</td>
<td>Executive Producer</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:INTERVIEWER</td>
<td>Interviewer</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:LIGHTING-OPERATOR</td>
<td>Lighting Operator</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:LIGHTING-SUPERVISOR</td>
<td>Lighting Supervisor</td>
</tr>
<tr>
<td></td>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:MAKEUP-ARTIST</td>
<td>Makeup Artist</td>
</tr>
<tr>
<td>Fully Qualified Classification Scheme Term</td>
<td>Term Name</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:MAKEUP-SUPERVISOR</td>
<td>Makeup Supervisor</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:MUSICIAN</td>
<td>Musician</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:MUSIC-SUPERVISOR</td>
<td>Music Supervisor</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:NARRATOR</td>
<td>Narrator</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:PERFORMER</td>
<td>Performer</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:PRODUCER</td>
<td>Producer</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:PRODUCTION-ASSISTANT</td>
<td>Production Assistant</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:PRODUCTION-DESIGNER</td>
<td>Production Designer</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:PROPERTY-ASSISTANT</td>
<td>Property Assistant</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:PROPERTY-MASTER</td>
<td>Property Master</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:PUBLISHER</td>
<td>Publisher</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:REPORTER</td>
<td>Reporter</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SCRIPTWRITER</td>
<td>Scriptwriter</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SET-DESIGNER</td>
<td>Set Designer</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SET-MAKER</td>
<td>Set Maker</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SFX-ASSISTANT</td>
<td>Special Effects Assistant</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SFX-SUPERVISOR</td>
<td>Special Effects Supervisor</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SINGER</td>
<td>Singer</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SOUND-EFFECTS-PERSON</td>
<td>Sound Effects Person</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SOUND-ENGINEER</td>
<td>Sound Engineer</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SOUND-SUPERVISOR</td>
<td>Sound Supervisor</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:STAFF</td>
<td>Staff</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SWITCHER</td>
<td>Switcher</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:SYNDICATOR</td>
<td>Syndicator</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:TECHNICAL-DIRECTOR</td>
<td>Technical Director</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:TIMEKEEPER</td>
<td>Timekeeper</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:TRANSPORTATION-CAPTAIN</td>
<td>Transportation Captain</td>
<td></td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:UNKNOWN</td>
<td>Unknown</td>
<td></td>
</tr>
</tbody>
</table>
### XPath(s)

```
../BasicDescription/CreditsList/CreditsItem[@role]
```

<table>
<thead>
<tr>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:VIDEO-ENGINEER</td>
<td>Video Engineer</td>
</tr>
<tr>
<td>urn:mpeg:mpeg7:cs:RoleCS:2001:WEBCASTER</td>
<td>Webcaster</td>
</tr>
<tr>
<td>urn:tva:metadata:cs:TVARoleCS:2011:AD7</td>
<td>Studio Manager</td>
</tr>
<tr>
<td>urn:tva:metadata:cs:TVARoleCS:2011:AD8</td>
<td>Assistant Studio Manager</td>
</tr>
<tr>
<td>urn:tva:metadata:cs:TVARoleCS:2011:V32</td>
<td>Commentary or Commentator</td>
</tr>
</tbody>
</table>
### XPath(s)

```
../BasicDescription/CreditsList/CreditsItem[@role]
```

<table>
<thead>
<tr>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>urn:tva:metadata:cs:TVARoleCS:2011:V83</td>
<td>Director of photography</td>
</tr>
<tr>
<td>urn:tva:metadata:cs:TVARoleCS:2011:V492</td>
<td>Production Secretary</td>
</tr>
</tbody>
</table>
### XPath(s)

```
../BasicDescription/CreditsList/CreditsItem[@role]
```

<table>
<thead>
<tr>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>urn:tva:metadata:cs:TVARoleCS:2011:V716</td>
<td>Second Assistant Director</td>
</tr>
</tbody>
</table>
### XPath(s)

```xml
.../BasicDescription/CreditsList/CreditsItem[@role]
```

<table>
<thead>
<tr>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>urn:tva:metadata:cs:TVARoleCS:2011:V751</td>
<td>Location Manager</td>
</tr>
</tbody>
</table>

### 6.11.7 Media Availability

The values identified in Table 70 are profiled from Freeview Play [i.11].
Table 70: Media Availability

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
</table>

6.11.8 Forward EPG Availability

The values identified in Table 71 are profiled from Freeview Play [i.11].

Table 71: Forward EPG Availability

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
</table>

6.11.9 Relationship

The values identified in Table 72 are profiled from TV-Anytime, ETSI TS 102 822-3-1 [7].

Table 72: Relationship

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
</table>
6.11.10 Restart Links

The values identified in Table 74 are profiled from Freeview Play [i.11].

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>.../ScheduleEvent/RelatedMaterial/HowRelated[@href]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


6.11.11 Restart Availability

The values identified in Table 75 are profiled from Freeview Play [i.11].

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>.../ScheduleEvent/Genre[@href]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| urn:fvc:metadata:cs:RestartAvailabilityCS:2018:restart_available | Restart is available                     |
| urn:fvc:metadata:cs:RestartAvailabilityCS:2018:restart_check   | The DVB-I client should check restart availability with Content Provider |
| urn:fvc:metadata:cs:RestartAvailabilityCS:2018:restart_pending | Restart is not currently available but is expected to be      |

6.11.12 Box Sets

The values identified in Table 76 are profiled from Freeview Play [i.11].

<table>
<thead>
<tr>
<th>XPath(s)</th>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>.../GroupInformation/RelatedMaterial/HowRelated[@href]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.11.13 More Episodes Available Genre

The values identified in Table 77 are profiled from Freeview Play [i.11].

<table>
<thead>
<tr>
<th>XPath(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.../GroupInformation/BasicDescription/Genre[@href]</td>
</tr>
<tr>
<td>.../Service/ServiceGenre[@href]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fully Qualified Classification Scheme Term</th>
<th>Term Name</th>
</tr>
</thead>
</table>

6.12 Media Metadata Precedence

NOTE: The scope of this clause has been narrowed to specifically address media metadata. For the precedence of service list metadata please refer to clause 5.2.1, and for the precedence of content guide metadata refer to clause 6.5.4.2.

Regarding a service instance's media properties (i.e. video, audio, subtitle and content protection attributes and availability), in-band metadata (e.g. ETSI TS 103 285 [1] DVB-DASH manifest, bitstreams or MPEG2-TS and elementary streams according to ETSI TS 101 154[22], service information in the transport stream according to ETSI EN 300 468 [6]), should take precedence over content guide metadata and Service List metadata when there is overlap, as in-band metadata is inherent to the actual content as utilised by the client to decode and render it, and as such provide the most accurate and up-to-date information for the DVB-I client.

For example, consider the following service within a service list, containing ContentAttributes.AudioAttributes defining the service's audio language:

```xml
<Service version="1">
  <UniqueIdentifier>tag:example.com,2020:Channel1</UniqueIdentifier>
  <ServiceInstance priority="1">
    <DisplayName>Channel One</DisplayName>
    <ContentAttributes>
      <AudioAttributes>
        <tva:Coding href="urn:dvb:metadata:cs:AudioCodecCS:2007:1.2.4">
          <tva:Name>MPEG-4 High Efficiency Advanced Audio Profile @ Level 4</tva:Name>
        </tva:Coding>
      </AudioAttributes>
      <VideoAttributes>
          <tva:Name>H264 High Profile @ Level 4.2</tva:Name>
        </tva:Coding>
      </VideoAttributes>
    </ContentAttributes>
    <DASHDeliveryParameters>
      <UriBasedLocation contentType="application/dash+xml">
        <URI>https://cdn.example.com/channel1/dash/manifest.mpd</URI>
      </UriBasedLocation>
    </DASHDeliveryParameters>
  </ServiceInstance>
</Service>
Additional audio languages may be available for specific programmes on this service. Consequently, programme content guide metadata containing such details would take precedence, for example:

```xml
<ProgramLocationTable xml:lang="en">
  <Schedule serviceIDRef="tag:example.com,2020:Channel1" start="2020-05-05T11:00:00Z" end="2020-05-05T11:30:00.000Z">
    <ScheduleEvent>
      <Program crid="crid://channel1.example.com/e03b3c3f"/>
      <InstanceDescription>
        <AVAttributes>
          <AudioAttributes>
          </AudioAttributes>
          <AudioAttributes>
          </AudioAttributes>
          <AudioAttributes>
            <AudioLanguage purpose="urn:tva:metadata:cs:AudioPurposeCS:2007:6" type="dubbed">de</AudioLanguage>
          </AudioAttributes>
          <VideoAttributes>
            <HorizontalSize>1280</HorizontalSize>
            <VerticalSize>720</VerticalSize>
            <AspectRatio>16:9</AspectRatio>
          </VideoAttributes>
          <AccessibilityAttributes>
            <SubtitleAttributes>
              <Coding href="urn:tva:metadata:cs:SubtitleCodingFormatCS:2023:2.1.3"/>
              <SubtitleLanguage>en</SubtitleLanguage>
              <Purpose href="urn:tva:metadata:cs:SubtitlePurposeCS:2023:2">false</Purpose> <SuitableForTTS>false</SuitableForTTS>
            </SubtitleAttributes>
            <AudioDescriptionAttributes>
              <AudioAttributes>
                <AudioLanguage>en</AudioLanguage>
              </AudioAttributes>
            </AudioDescriptionAttributes>
            <AccessibilityAttributes>
            </AccessibilityAttributes>
          </AccessibilityAttributes>
        </AVAttributes>
      </InstanceDescription>
    </ScheduleEvent>
  </Schedule>
</ProgramLocationTable>
```
Finally, when playing the DVB-DASH stream of the service in this example, the DASH manifest and the audio/video bitstreams will inform the client of the exact audio/video coding used, as well as the specific audio streams available. These may differ from the associated service and programme content guide metadata, and take precedence upon playback of the service.

7 Security

7.1 Introduction

This clause covers security, including risks and mitigations and the use of TLS as a security mechanisms.

7.2 Risks and mitigations (informative)

7.2.1 Ensuring users get the expected (correct) service

7.2.1.1 One Service List Provider impersonating another

If the DVB-I client permits the user to choose a service list based on information from the Service List Provider (e.g. ServiceList.Name and/or ServiceList.ProviderName) then a Service List Provider may mis-represent their service list such that users choose that service list and not the intended one. Extreme examples of this may be addressed as trademark infringement but there may also be social engineering attacks which stop short of trademark violation.

Mitigation: Service list registry operators need operational procedures to address this. For example, manual examination of the contents of these fields and checking that they reasonably reflect the identity of the Service List Provider.

7.2.1.2 One service impersonating another - social engineering

Users will choose services based on information from a service list (e.g. Service.ServiceName and/or Service.ProviderName). A service provider may mis-represent their services in a service list so that users choose that service and not the intended one. Extreme examples of this may be addressed as trademark infringement but there may also be social engineering attacks which stop short of trademark violation.

Mitigation: Organizations compiling service lists need operational procedures to address this. For example, manual examination of the contents of these fields and checking that they reasonably reflect the identity of the service provider.

7.2.1.3 One service impersonating another - hybrid

A service provider may mis-represent a DASH service such that a false positive match is created with an existing broadcast service and indicates the DASH service instance has higher priority (i.e. lower value). This would result in users not getting the expected service.

Mitigation: Organizations compiling service lists need operational procedures to address this. For example, manual review that the broadcast service instance and the DASH service instance match.
7.2.1.4  Compromising Service List Registry servers or service list servers

An attacker who was able to compromise the server hosting a Service List Registry or one or more Service Lists would be able to replace the service lists or contents of them.

Mitigation: Service List Registry operators need to follow best practice security for the web. The same applies for organizations hosting Service Lists and content referenced from them.

7.2.1.5  Man in the middle attack on Service List Provider - broadcast

When a Service Lists is announced in the broadcast channel (see clause 5.1.3.3 of the present document), there is a risk of a man in the middle attack on the broadcast replacing the signalled URI.

Mitigation: None.

NOTE 1: The techniques defined in clause 9 of ETSI TS 102 809 [5] can be used to protect elementary streams in a broadcast DVB service from man in the middle attacks. However, the NIT and BAT used to signal Service Lists are carried outside a service and cannot be protected using these techniques.

NOTE 2: A man in the middle attack on the NIT or BAT would likely reach far more victims by a replacing a broadcast service with a modified broadcast version of that service than replacing Service List signalling.

7.2.2  Ensuring content is only available to users allowed to consume it

There are many different reasons why some users may not be allowed to consume particular content. Some examples include the following:

- The content needs to be paid for and an individual user has not done so.
- A particular device may not meet security requirements for the consumption of particular content.
- The service provider may not wish (or may not be allowed) to deliver the content to consumers in a particular location, e.g.:
  - The service provider may not have obtained the rights to deliver the content to consumers in that location from the content owner.
  - The service provider may not meet the legal and/or regulatory requirements to offer content to users in that location.

Mitigation: Service providers may use any of the techniques used with internet delivered video in order to ensure content is only available to users allowed to consume it. Different techniques have different costs and benefits which are outside the scope of the present document. Different content owners may have their own specific requirements. Some examples include the following:

- IP geo-blocking
- DRM. Clause 8 of ETSI TS 103 285 [1] addresses content protection including DRM
- TLS according to clause 7.3 or W3C EME [i.5] Clear Key

NOTE: In the present document, EME Clear Key can only be used by an HTML5 linked application, see clause 5.1.6.

7.2.3  Leakage of content

Some content providers will impose requirements on service providers to ensure that some content is protected from leaking beyond the users who are permitted to consume it and the device(s) on which those users are permitted to consume that content. For example, ensuring that a user does not use tools such as Wireshark to capture content. Different content will have different requirements depending on the content provider and/or service provider.
Mitigation: Service providers will need to choose appropriate solutions for the content to be protected. Some content may need to be protected with DRM - see clause 8 of ETSI TS 103 285 [1]. Weaker protection may be permitted for other content, e.g. TLS according to clause 7.3 or W3C EME [i.5] Clear Key.

7.2.4 Protecting user identification information

There will be some services where users need to identify themselves and/or pay for. This is outside the scope of the present document. Some examples of how this could be done include the following:

- A linked application may offer the user a UI for payment in the same way as is done in the web today.
- The user may make payments on a different device (e.g. a personal computer) and copy some kind of identifier(s) into the DVB-I client.
- The user may make payments using a different application on the same device and copy some kind of identifier(s) into the DVB-I client.

NOTE: Mechanisms by which identifiers could be copied into a DVB-I client are outside the scope of the present document. Devices supporting multiple applications may permit copy/paste between applications. The DVB-I client on a device with a camera may support QR codes.

All of these will result in some kind of identification information being held by the DVB-I client. Such identifiers will need to be protected.

Mitigation: Implementers of the DVB-I client need to securely store any such identifiers. Requirements for how this is done are outside the scope of the present document.

7.3 Use of HTTP over TLS

All HTTP transactions and connections between the DVB-I client and DVB-I metadata endpoints, specifically Service List Registries, Service List Servers, Content Guide Servers, described in the present document shall be performed using HTTP over TLS as defined in IETF RFC 9110 [14], using root certificates, cipher suites, signature algorithms, key sizes and elliptic curves as defined in clause 11.2 of ETSI TS 102 796 [21], as applicable for the TLS version used.

For the specific case that a DVB-I client connects to a DVB-I metadata endpoint located on the same private subnet (see clause 3 of IETF RFC 1918 [27]), HTTP may be used without TLS.

A DVB-I client shall support TLS version 1.3 defined in IETF RFC 8446 [25] or later, and TLS version 1.2 defined in IETF RFC 5246 [26] for interoperability.

DVB-I metadata endpoint servers shall support TLS version 1.2 defined in IETF RFC 5246 [26] and should support TLS version 1.3 defined in IETF RFC 8446 [25] or later.

8 Interoperability Points

8.1 Introduction

Consumers, accustomed to the user experience offered today when watching TV services delivered over broadcast networks, will legitimately expect an equivalent or better user experience when accessing services on a receiver with DVB-I capabilities.

This clause describes the minimum set of functionalities required for delivery and consumption of free-to-view DVB-I services providing a user experience that is indistinguishable from current live/linear services as delivered over broadcast networks (i.e. DVB-S/T/C/IPTV) in most markets.
A Service List can include metadata relevant to both broadcast and broadband services, thus enabling hybrid Service List management. However, the specific receiver requirements depend on the category of the receiving device hosting the DVB-I client, as described below.

8.2 Interoperability Point - IP0

The minimum feature receiver allows service providers and receivers to deliver and access free-to-view DVB-I services that consist of video, audio, and subtitles without personalization. For this interoperability point no distinction is made between mobile/nomadic and hybrid device. The required features of the DVB-I client are:

- Retrieve a service list from a preconfigured location.
- Process and store the service list in the receiver.
- The client should allow the customer to:
  - Display to the user the list of channels
  - Enable the user to navigate and select a channel using an appropriate method for the receiver
  - Enable the user to display and select the available programme components such as subtitles and accessibility options

8.3 Interoperability Point - IP1

This interoperability point identifies service features of a typical television viewing experience, one which is richer in user features and more in line with current television services.

For mobile/nomadic IP-only receivers, i.e. receivers only equipped with a network interface for lean-forward consumption of broadband services (e.g. smartphone, tablet, personal computer, etc.), the required features of the DVB-I client are:

- Find the URLs of relevant Service Lists by querying a Service list Registry.
- Acquisition of one or more Service Lists (i.e. downloading service lists published on given URLs and identifying and storing the DVB-DASH services listed within them).
- Navigation through the installed services with a user interface tailored to the device (e.g. touch interface for a smartphone/tablet, mouse and keyboard interface for a laptop/personal computer).
- Selection of a specific service within a reasonable acquisition time.
- Continuous presentation of the selected DVB-DASH stream consisting of video, audio and subtitles.
- Display of basic service information (i.e. "Info" button) including service name, logo, EPG (now/next), audio/video attributes.
- Identification of streams with content protection applied.

For hybrid receivers, i.e. receivers also equipped with tuner(s) for DVB-S/T/C/IPTV services (e.g. connected TV or STB), in addition to the basic requirements supported by nomadic/mobile IP-only receivers, the required features of the DVB-I client are:

- Installation of a Service List announced on broadcast channels via DVB-SI metadata.
- Full LCN support, including regionalized LCN lists.
- Management of the hybrid service list by matching/disambiguating/prioritizing services signalled in the Service List with locally tuned broadcast services, including part-time services.
• Navigation through the services by means of a remote control (i.e. typing numbers, using P+/P- keys),
  transparently zapping between broadcast and broadband services.
• Support for service-related apps.

In addition to the above categories, IP-only lean-back receivers for consumption of broadband services (e.g. connected
TV or STB not equipped with broadcast tuner) offer a user experience in line with hybrid receivers, except for
accessing metadata delivered on broadcast channels and managing hybrid service lists.

8.4 Interoperability Point - IP2

For hybrid receivers, i.e. receivers also equipped with tuner(s) for DVB-S/T/C/IPTV services (e.g. connected TV or
STB), in addition to requirements listed in IP1 (clause 8.3), the required features of the DVB-I client compliant to IP2
are listed below. Most of them aim to equate access to broadband serviced to the one already in place for broadcast
services, providing a stable and predictable user experience.

• Installation of a Service List which is country dependent, using a pre-provisioned URL. Such a URL gives
  access to a Service List Registry hosting service lists for the country.
  - The method to activate the pre-provisioned URL is implementation dependent.
• Trusted service list management by means of the regulatorListFlag in table 83.
• Support for the LCNTable@preserveBroadcastLCN, see table 93, when creating a hybrid channel list, to
  ensure LCNs allocated by a national regulator to broadcast services are preserved.
• Management of parental rating by means of ActualStartTime and
  ActualStartTime + ActualDuration provided by the content guide metadata as defined in table 105f.
• Service instance priority and fallback management according to clause 5.2.13.
• Channel list management:
  - Handling updates automatically according to clause 8.5.4.1.
  - Favourite channel list.
• Generic html5 application controlling media presentation not available to be managed as defined in clause
  5.2.13.
• Provisioning of separate content guide servers by different service providers by means of the
  ContentGuideSource elements as described in clause 6.1.
• One or more DRM systems, CENC-compliant embedded in the client.
• Broadband-Broadcast timing gap by means of MPD@suggestedPresentationDelay, according to table 78.
• Region definition and selection at least to secondary sub-region level. See clauses 5.6.2 and 5.6.3.3.
• Temporary channel typically created for the distribution of time-limited programming covering real-world
events (e.g. sports event such as the Olympics or a world cup competition), in which the service instances are
constrained by availability windows as defined in clause 5.2.5.
8.5 Service Features

8.5.1 Introduction

In each table in this clause, the value "Y" in columns labelled "minimum", "hybrid", "IP-only lean-back" or "IP-only mobile" indicates that support of that requirement is mandatory to realize the expected functionality of the profile, i.e. receivers are required to understand and act on that item when present in the service list. The lack of a "Y" indication for any XML element or attribute does not indicate that the XML document should be provided without the element or attribute: these tables indicate the implementation functions, XML elements and attributes according to their definition.

NOTE 1: In the following, requirements relevant to a specific delivery system (e.g. DVBCDeliveryParameters) are applicable only to hybrid receivers equipped with that specific tuner.

NOTE 2: DVB-IPTV is considered a function of a hybrid receiver, even if it is consumed via the IP interface.

NOTE 3: Support for ContentProtection signalling does not imply support for any content protection schemes, only the capability to identify whether content is protected and whether the receiver supports the content protection scheme used or not.

8.5.2 Service Delivery


Table 78: Additional minimum requirements for DVB-DASH service delivery

<table>
<thead>
<tr>
<th>Functionality</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low latency service playout (excluding requirements on video decoding speed (clause 10.20.7.3 in ETSI TS 103 285 [1]) and startup delay requirements (clause 10.20.7.4 in ETSI TS 103 285 [1])</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Start-up delay requirements (clauses 10.20.7.3 and 10.20.7.4 of ETSI TS 103 285 [1])</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Support for content decryption based on common encryption with 'cenc' support</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Support for MPD Events with DVB programme metadata (clause 9.1.2 of ETSI TS 103 285 [1])</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Integration of DVB-DASH and DVB Application Signalling (clause 9.1.8 of ETSI TS 103 285 [1])</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Support for MPD@suggestedPresentationDelay attribute (clause 10.9.2 of ETSI TS 103 285 [1])</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Support for NGA and HDR is optional. Hybrid receivers that support one or more NGA technologies for broadcast services shall also support the same NGA technologies for DVB-DASH services (see clauses 6.3, 6.4, 6.7, 6.8 and 10.18 of ETSI TS 103 285 [1]). Hybrid receivers that support one or more HDR technologies for broadcast services should also support the same HDR technologies for DVB-DASH services (see clauses 5.2.6 and 5.2.7 of ETSI TS 103 285 [1]) to provide a consistent viewing experience irrespective of the delivery system.
8.5.3 Service Discovery

8.5.3.1 Service list discovery during installation phase

Table 79 indicates the Service List discovery mechanisms which are applicable to each interoperability point.

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>URL of Service List(s) retrieved by means of a query to a Service List Registry (see clause 5.1.3.2).</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>URL of Service List(s) retrieved by looking for the specific uri_linkage_descriptor in on air NIT/BAT of broadcast services (see clause 5.1.3.3).</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URL of Service List(s) retrieved by looking for the specific uri_linkage_descriptor in a CICAM NIT (see clauses 5.1.3.4 and 5.1.3.6). This mechanism is only applicable when the receiver supports CI Plus [33] and if a CIPlus CAM is used.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>URL of Service List(s) hosted by a CICAM auxiliary file system retrieved by looking for the specific uri_linkage_descriptor in a CICAM NIT (see clauses 5.1.3.5 and 5.1.3.6). This mechanism is only applicable when the receiver supports CI Plus [33] and if a CIPlus CAM is used.</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard coded (or privately provisioned) URL of Service List(s)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Service List Providers for a particular deployment (e.g. country, market, platform, ...) may only have their Service Lists discoverable by a limited number of mechanisms, perhaps even just one. Hence, in order for a DVB-I client to access the services from a particular deployment, the DVB-I client needs to support at least one service list discovery mechanism that can return Service Lists for that deployment.

The discovery method or methods used for one deployment, shall not preclude using a different discovery method or methods for another deployment.

NOTE 1: At the time of writing, there is no Central Service List Registry. Early deployments are expected to make their Service Lists available using a well-known URL which DVB-I clients will need to know. The well-known URL could refer directly to a Service List or to a Service List Registry. At the time of writing, a well-known URL referring directly to a Service List is more common. A well-known URL referring to a Service List could be hard-coded into a DVB-I client, or the DVB-I client provider could have their own Service List Registry, or the DVB-I client could use some other mechanism such as downloading a configuration file containing the Service List or Service List Registry URLs.

NOTE 2: Service List or Service List Registry discovery based on a uri_linkage_descriptor in the NIT/BAT needs to be used in combination with technical and/or operational processes and measures to ensure that only appropriate URLs are used by the DVB-I client.

8.5.3.2 Support of service discovery metadata

The following tables indicate for each DVB-I service discovery function defined in clause 5, its status in terms of required support by service providers and receivers.

Table 80: Support of Service List Entry Point fields
### Table 81: Support of Organization fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid</td>
<td>Lean-back</td>
</tr>
<tr>
<td>ServiceListEntryPoints</td>
<td></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ServiceListRegistryEntity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ProviderOffering</td>
<td></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Extension</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the elements be found in table 9.

### Table 82: Support of Provider Offering fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid</td>
<td>Lean-back</td>
</tr>
<tr>
<td>Provider</td>
<td></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ServiceListOffering</td>
<td></td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the elements can be found in table 11.
### Table 83: Support of Service List Offering fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back receiver</td>
</tr>
<tr>
<td>ServiceListName</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ServiceListURI</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Delivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Language</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Genre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TargetCountry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRSSupport</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@postcode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@regionID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@receivedMultiplex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ServiceListId</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@regulatorListFlag</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**NOTE 1:** Semantic definitions of the elements and attributes can be found in table 83.

**NOTE 2:** Within a `ServiceListOffering`, preference shall be given to Service Lists with `@regulatorListFlag` set to true. If a Service List Registry response includes any lists with `@regulatorListFlag` set to true then DVB-I clients shall either i) select a Service List with `@regulatorListFlag` set to true or ii) offer the user a choice of Service Lists where the default option is a Service List with `@regulatorListFlag` set to true.

### Table 83a: Support of Delivery Type fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back receiver</td>
</tr>
<tr>
<td>DASHDelivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@minimumBitRate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVBTDelivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@originalNetworkID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVBCDelivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@networkID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVBSDelivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@originalNetworkID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTSPDelivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@minimumBitRate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MulticastTSDelivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@minimumBitRate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ApplicationDelivery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Application</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@contentType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@xmlAitApplicationType</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>OtherDeliveryParameters</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>@extensionName</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the elements and attributes can be found in tables 12a to 12l.
### Table 84: Support of Service List fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>ServiceList</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Name</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ProviderName</td>
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<td></td>
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<tr>
<td>LanguageList</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>RelatedMaterial</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>RegionList</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>TargetRegion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCNTableList</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ContentGuideSourceList</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ContentGuideSource</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Service</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>TestService</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>SubscriptionPackageList</td>
<td>Y</td>
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<tr>
<td>@id</td>
<td>Y</td>
<td>Y</td>
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</tr>
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<td>@version</td>
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<tr>
<td>@responseStatus</td>
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<td></td>
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<tr>
<td>@xml:lang</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the elements and attributes can be found in table 14.

### Table 85: Support of Service Type fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
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<th>IP1</th>
<th>IP2</th>
</tr>
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<tbody>
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<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
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<tr>
<td>UniqueIdentifier</td>
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<td>Y</td>
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<tr>
<td>ServiceInstance</td>
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<td>Y</td>
</tr>
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<td>TargetRegion</td>
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<tr>
<td>ServiceName</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ProviderName</td>
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<tr>
<td>RelatedMaterial</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
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<td>ServiceGenre</td>
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<td>ServiceType</td>
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<td>Y</td>
<td>Y</td>
</tr>
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<td>ServiceDescription</td>
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<tr>
<td>RecordingInfo</td>
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<td>ContentGuideSource</td>
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</tr>
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<td>ContentGuideSourceRef</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ContentGuideServiceRef</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>AdditionalServiceParameters</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
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<td>NVOD</td>
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<td>ProminenceList</td>
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### Table 86: Support of ServiceInstanceType fields

<table>
<thead>
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<th>IP2</th>
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<tbody>
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<td>Y</td>
</tr>
<tr>
<td>RelatedMaterial</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ContentProtection</td>
<td></td>
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<tr>
<td>Y note 1</td>
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<td>Y</td>
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<tr>
<td>Y note 1</td>
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<tr>
<td>Y note 2</td>
<td>Y</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Y note 3</td>
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<td></td>
</tr>
<tr>
<td>Y note 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y note 4</td>
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<td>Y note 4</td>
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<tr>
<td>Y note 5</td>
<td>Y</td>
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<td></td>
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<tr>
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<tr>
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<tr>
<td>MulticastTSDeliveryParameters</td>
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<td>SATIPDeliveryParameters</td>
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<td></td>
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<tr>
<td>OtherDeliveryParameters</td>
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<td></td>
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<tr>
<td>Y</td>
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<td>IdentifierBasedDeliveryParameters</td>
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<tr>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@id</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

NOTE 1: Service related applications if HbbTV supported, service logos.
NOTE 2: Service logos.
NOTE 3: Only required if DVB-T/T2 is supported.
NOTE 4: Only required if DVB-S/S2 is supported.
NOTE 5: Only required if DVB-C/C2 is supported.
NOTE 6: Only required if DVB-IPTV is supported.
NOTE 7: Semantic definitions of the elements and attributes can be found in table 16.
### Table 87: Support of ContentAttributesType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>AudioAttributes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AudioConformancePoint</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>VideoAttributes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VideoConformancePoint</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>AccessibilityAttributes</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 18.

### Table 88: Support of ContentGuideSourceListType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>ContentGuideSource</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 19.

### Table 89: Support of ContentGuideSourceType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>Name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ProviderName</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RelatedMaterial</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ScheduleInfoEndpoint (see note 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ProgramInfoEndpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GroupInfoEndpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MoreEpisodesEndpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@CGSID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@minimumMetadataUpdatePeriod</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@xml:lang</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1: At least, support for "now/next".
NOTE 2: Semantic definitions of the elements and attributes can be found in table 20.
### Table 90: Support of DVBTripletType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>@origNetId</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>@tsId</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>@serviceId</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the attributes can be found in table 21.

### Table 91: Support of LCNTableEntryType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>@channelNumber</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>@serviceRef</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>@selectable</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>@visible</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the attributes can be found in table 23.

### Table 92: Support of LCNTableListType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
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<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>LCNTable</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the element can be found in table 24.

### Table 93: Support of LCNTableType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid receiver</td>
<td>IP-only lean-back</td>
</tr>
<tr>
<td>TargetRegion</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>SubscriptionPackage</td>
<td>Deprecated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCN</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>LCNRange</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>@preserveBroadcastLCN</td>
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</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the elements can be found in table 25.
Table 94: Support of ServiceAvailabilityType fields

<table>
<thead>
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<th>IP0</th>
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<td>Period</td>
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</tr>
<tr>
<td><code>@validFrom</code></td>
<td>Y</td>
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<td></td>
</tr>
<tr>
<td><code>@validTo</code></td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Interval</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td><code>@days</code></td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
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<td><code>@recurrence</code></td>
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<td></td>
</tr>
<tr>
<td><code>@startTime</code></td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td><code>@endTime</code></td>
<td>Y</td>
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</table>

NOTE: Semantic definitions of the elements and attributes can be found in table 26.

Table 95: Support of DVBTDeliveryParametersType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>TargetCountry</td>
<td></td>
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</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 27.

Table 96: Support of DVBSDeliveryParametersType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>OrbitalPosition</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Frequency</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Polarization</td>
<td>Y</td>
<td>Y</td>
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<td>SymbolRate</td>
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<td>RollOff</td>
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<td>ModulationType</td>
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<td>ChannelBonding</td>
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<td><code>@primary</code></td>
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</table>

NOTE: Semantic definitions of the elements can be found in table 28.
### Table 97: Support of DVBCDeliveryParametersType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
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<tbody>
<tr>
<td>DVBTriplet</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>TargetCountry</td>
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<td>NetworkID</td>
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<td>Y</td>
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<td><strong>NOTE:</strong></td>
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</tbody>
</table>

Semantic definitions of the elements can be found in table 29.

### Table 98: Support of RTSPDeliveryParametersType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
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<th>IP2</th>
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</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
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<td></td>
<td>Y</td>
</tr>
<tr>
<td>RTSPURL</td>
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</tr>
<tr>
<td>MinimumBitRate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Semantic definitions of the elements can be found in table 30.

### Table 99: Support of MulticastTSDeliveryParametersType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVBTriplet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPMulticastAddress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MinimumBitRate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Semantic definitions of the elements can be found in table 31.

### Table 100: Support of DASHDeliveryParametersType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>UriBasedLocation</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>MinimumBitRate</td>
<td></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Extension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Semantic definitions of the elements can be found in table 32.
### Table 101: Support of SATIPDeliveryParametersType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>QueryParameters</td>
<td>IP0</td>
<td>IP1</td>
<td>IP2</td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the element can be found in table 33.

### Table 102: Support of FTACContentManagementType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>@userDefined</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@doNotScramble</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@controlRemoteAccessOverInternet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@doNotApplyRevocation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the attributes can be found in table 34.

### Table 103: Support of ContentProtectionType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASystemId</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@cpsIndex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRMSystemId</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@encryptionScheme</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@cpsIndex</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the elements and attributes can be found in table 35.

### Table 104: Support of RegionListType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PostcodeType</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>WildcardPostcodeType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PostcodeRangeType</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@from</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@to</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>LatitudeType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LongitudeType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RadiusType</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoordinatesType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radius</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CountryRegionType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RegionName</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postcode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WildcardPostcode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PostcodeRange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@regionID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@selectable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@countryCodes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@xml:lang</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PrimaryRegionType</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>RegionName</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Region</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Postcode</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>WildcardPostcode</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>PostcodeRange</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Coordinates</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@regionID</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@selectable</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>SecondaryRegionType</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>RegionName</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Region</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Postcode</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>WildcardPostcode</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>PostcodeRange</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Coordinates</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@regionID</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@selectable</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>TertiaryRegionType</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>RegionName</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Postcode</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>WildcardPostcode</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>PostcodeRange</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Coordinates</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@regionID</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@selectable</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>RegionListType</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Region</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@version</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>@xml:lang</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**NOTE:** Semantic definitions of the elements and attributes can be found in table 38.
Table 105: Support of DASHPlaylistType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playlist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PlaylistEntry</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 39.

Table 105a: Support of SubscriptionPackageListType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SubscriptionPackage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@allowNoPackage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 37b.

Table 105b: Support of NVODType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>@mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@offset</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 37c.

Table 105c: Support of ServiceProminenceListType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prominence</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 37d.
Table 105d: Support of ServiceProminenceEntryType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid</td>
<td>IP-only</td>
</tr>
<tr>
<td>@country</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@region</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ranking</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 37e.

Table 105e: Support of ParentalRatingType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid</td>
<td>IP-only</td>
</tr>
<tr>
<td>MinimumAge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@countryCodes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Semantic definitions of the elements can be found in table 37f.

Table 105f: Sources of Parental Rating information

<table>
<thead>
<tr>
<th>Source</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service.ParentalRating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From content guide metadata using</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ScheduleEvent.ActualStartTime and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ActualDuration (if present) otherwise</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>ScheduleEvent.PublishedStartTime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and PublishedDuration.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See clause 4.5 of DVB Bluebook A184.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>From AdaptationSet.Rating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTE 1: See clause 5.5.28. The</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>requirements there enable DVB-I clients to safely ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AdaptationSet@Rating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Content Programme Metadata carried in DASH MPD events</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>From Content Programme Metadata carried in DASH inband events</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1: See clause 5.5.28. The requirements there enable DVB-I clients to safely ignore

Table 105g: Support of LCNRangeType fields

<table>
<thead>
<tr>
<th>Element/attribute</th>
<th>IP0</th>
<th>IP1</th>
<th>IP2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Hybrid</td>
<td>IP-only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.5.4 Other Service Characteristics

8.5.4.1 Automatic update

The channel list shall be maintained up to date. Selection performed by the User during the channel list creation process shall be maintained. Different implementation, by different manufacturer, of “Channel list update” for RF channel is accepted, the access to CSR should be performed once a day in order to avoid CSR overload, preferably randomizing access to CSR during the night.

8.6 Content Guide Features

There is no implementation specific profiling of Content Guide metadata as defined in clause 6. All metadata provided in the content guide response shall be supported.

9 Carriage

9.1 Introduction

This clause specifies how DVB-I service instances and DVB-I metadata are signalled in different distribution systems.

9.2 Carriage in DVB-SI

Refer to clause 5.1.3.3.

9.3 Carriage in MBMS System

9.3.1 Service class signalling

According to clause 11.2.1.2 of ETSI TS 126 346 [39], the class of an MBMS User Service is signalled using the `userServiceDescription@serviceClass` attribute in an MBMS User Service Description metadata fragment. When conveying a DVB-I service instance or DVB-I metadata in an MBMS System this attribute shall be present and shall indicate the appropriate service class identifier specified in table 106 below.

<table>
<thead>
<tr>
<th>Service class identifier</th>
<th>Content conveyed in corresponding MBMS User Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>urn:dvb:metadata:serviceClass:DVB-I_Service_List:1</code></td>
<td>A single DVB-I service list document, as specified in clause 5.5.1.</td>
</tr>
</tbody>
</table>
Service class identifier | Content conveyed in corresponding MBMS User Service
---|---
urn:dvb:metadata:serviceClass:DVB-I_Service_Instance:1 | The media assets of a DVB-I service instance (e.g. a DVB-DASH service as specified in ETSI TS 103 285 [1]), further parameters of which are indicated in its MBMS User Service Description, as specified in clause 5.2.2 of ETSI TS 126 346 [39].

9.3.2 MBMS Client behaviour

The service class identifier shall be exposed by the MBMS Client to the DVB-I client (acting as an MBMS-Aware Application) as specified in clause 6.2 of ETSI TS 126 347 [40]. This enables the DVB-I client to identify MBMS User Services advertised in the MBMS Service Announcement Channel that convey DVB-I metadata or a DVB-I service instance.

9.3.3 DVB-I client behaviour

The DVB-I client (acting as an MBMS-Aware Application) shall first invoke the MBMS Client to start receiving the MBMS Service Announcement Channel, as specified in clause 5.2.3 of ETSI TS 126 346 [39]. As a result, MBMS User Service Descriptions for all MBMS User Services available in the MBMS System are received by the MBMS Client, a subset of which may convey DVB-I metadata or a DVB-I service instance.

If it has no unicast network connection, the DVB-I client (acting as an MBMS-Aware Application) shall attempt to acquire a DVB-I service list from an MBMS User Service of the appropriate service class, and may subsequently also attempt to obtain DVB-I Content Guide metadata from an MBMS User Service of the appropriate service class. If it has chosen to acquire these metadata documents from the MBMS System, the DVB-I client shall subscribe to receive corresponding notifications from the MBMS Client and shall acquire new versions of these documents as and when the MBMS Client notifies it of updates to them on their respective MBMS User Services.

When a DVB-I service instance with an mbms:// locator is selected by the user, the DVB-I client (acting as an MBMS-Aware Application) shall invoke the MBMS Client to initiate reception of the corresponding MBMS User Service. The application entry point document (e.g. DVB-DASH Media Presentation Description) referenced by the MBMS User Service Description shall be passed to the media player (e.g. DVB-DASH player) to commence playback of the selected DVB-I service instance.
Annex A (normative):
Schemas

A.1 DVB-I Service Discovery schema

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE schema [
<!ENTITY PostcodeChar "A-Za-z0-9">  
<!ENTITY PostcodeSep "\- ">  
<!ENTITY Postcode "[&PostcodeChar;]+([&PostcodeSep;]\[&PostcodeChar;\]+)?">  
<!ENTITY PostcodeWildFirst "[\*[&PostcodeChar;]\*[&PostcodeSep;]?[&PostcodeChar;]\*]">  
<!ENTITY PostcodeWildMiddle "([&PostcodeChar;]+[&PostcodeSep;]?[&PostcodeChar;]+)|([&PostcodeChar;]+[&PostcodeSep;]?[&PostcodeChar;]\*\*)">  
<!ENTITY PostcodeWildLast "[&PostcodeChar;]+[&PostcodeSep;]?[&PostcodeChar;]\*">  
<!ENTITY DecimalByte "(([1-9]?:?[0-9])|(1\[[0-9]\][0-9])|(2\[[0-4]\][0-9])|(25\[[0-5]\]))">  
<!ENTITY IPv4Address "(&DecimalByte;\.){3}&DecimalByte;">  
<!ENTITY HexDigit "\[0-9A-Fa-f\]">  
<!ENTITY Hex32 "&HexDigit;{1,8}">  
<!ENTITY Hex16 "&HexDigit;{1,4}">  
<!ENTITY Hex8 "&HexDigit;{1,2}">]<>  


  <import namespace="urn:dvb:metadata:servicediscovery-types:2023" schemaLocation="dvbi_types_v1.0.xsd"/>
  <import namespace="urn:tva:metadata:2024" schemaLocation="tva_metadata_3-1.xsd"/>
  <import namespace="urn:tva:mpeg7:2008" schemaLocation="tva_mpeg7.xsd"/>
  <import namespace="http://www.w3.org/XML/1998/namespace" schemaLocation="xml.xsd"/>

  <element name="ServiceList" type="dvbisd:ServiceListType"/>
  <element name="Playlist" type="dvbisd:DASHPlaylistType"/>

  <complexType name="ServiceListType">
    <sequence>
      <element name="Name" type="mpeg7:TextualType" maxOccurs="unbounded"/>
      <element name="ProviderName" type="mpeg7:TextualType" maxOccurs="unbounded"/>
      <element name="LanguageList" type="dvbisd:LanguageListType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="RegionList" type="dvbisd:RegionListType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="TargetRegion" type="dvbisd:RegionIdRefType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="LCNTableTable" type="dvbisd:LCNTableListType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="ContentGuideSourceList" type="dvbisd:ContentGuideSourceListType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="ContentGuideSource" type="dvbisd:ContentGuideSourceType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="TestService" type="dvbisd:ServiceType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="SubscriptionPackageList" type="dvbisd:SubscriptionPackageListType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="ServicelentifierType" type="dvbii-types:ServicelentifierType" minOccurs="0" maxOccurs="unbounded"/>
      <element name="version" type="positiveInteger" use="required"/>
      <element name="responseStatus" use="optional"/>
    </sequence>

    <attribute name="id" type="dvbi-types:ServiceIdentifierType" use="required"/>
    <attribute name="version" type="positiveInteger" use="required"/>
  </complexType>
</schema>
<restriction base="string">
  <enumeration value="OK"/>
  <enumeration value="ERROR_INVALID_MUX_INFO"/>
  <enumeration value="ERROR_INVALID_REQUEST"/>
  <enumeration value="ERROR_BUSY"/>
  <enumeration value="ERROR_GENERIC_FAILURE"/>
  <enumeration value="ERROR_INVALID_POSTCODE"/>
  <enumeration value="ERROR_INVALID_REGION_ID"/>
</restriction>
</attribute>
</complexType>
<complexType name="LanguageListType">
  <sequence>
    <element name="Language" type="tva:AudioLanguageType" maxOccurs="unbounded"/>
  </sequence>
</complexType>
<complexType name="ContentGuideSourceListType">
  <sequence>
    <element name="ContentGuideSource" type="dvbisd:ContentGuideSourceType" maxOccurs="unbounded"/>
  </sequence>
  <attribute ref="xml:lang"/>
</complexType>
<complexType name="ContentGuideSourceType">
  <sequence>
    <element name="Name" type="mpeg7:TextualType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ProviderName" type="mpeg7:TextualType" maxOccurs="unbounded"/>
    <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ScheduleInfoEndpoint" type="dvb-types:ExtendedURIType"/>
    <element name="ProgramInfoEndpoint" type="dvb-types:ExtendedURIType" minOccurs="0"/>
    <element name="GroupInfoEndpoint" type="dvb-types:ExtendedURIPathType" minOccurs="0"/>
    <element name="MoreEpisodesEndpoint" type="dvb-types:ExtendedURIType" minOccurs="0"/>
    <attribute name="CGSID" type="dvbisd:ContentGuideProviderIdType" use="required"/>
    <attribute name="minimumMetadataUpdatePeriod" type="duration"/>
    <attribute ref="xml:lang"/>
  </sequence>
</complexType>
<complexType name="ContentGuideProviderIdType">
  <restriction base="ID"/>
</complexType>
<complexType name="ContentGuideProviderRefIdType">
  <restriction base="IDREF"/>
</complexType>
<complexType name="ServiceType">
  <sequence>
    <element name="UniqueIdentifier" type="dvbi-types:ServiceIdentifierType"/>  
    <element name="ServiceInstance" type="dvbisd:ServiceInstanceType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="TargetRegion" type="dvbisd:RegionIdRefType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ServiceName" type="mpeg7:TextualType" maxOccurs="unbounded"/>
    <element name="ProviderName" type="mpeg7:TextualType" maxOccurs="unbounded"/>
    <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ServiceGenre" type="tva:GenreType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ServiceType" type="tva:ControlledTermType" minOccurs="0"/>  
    <element name="ServiceDescription" type="tva:SynopsisType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="RecordingInfo" type="tva:ControlledTermType" minOccurs="0" maxOccurs="0"/>
    <choice minOccurs="0">
      <element name="ContentGuideSource" type="dvbisd:ContentGuideSourceType"/>  
      <element name="ContentGuideSourceRef" type="dvbisd:ContentGuideProviderRefIdType"/>
    </choice>
  </sequence>
</complexType>
<element name="ContentGuideServiceRef" type="string" minOccurs="0"/>
<element name="AdditionalServiceParameters" type="dvbi-types:ExtensionBaseType"
  minOccurs="0" maxOccurs="unbounded"/>
<element name="NVOD" type="dvbisd:NVODType" minOccurs="0"/>
<element name="ProminenceList" type="dvbisd:ServiceProminenceListType" minOccurs="0"/>
<element name="ParentalRating" type="dvbisd:ParentalRatingType" minOccurs="0"/>
</sequence>
<attribute name="dynamic" type="boolean" default="false"/>
<attribute name="version" type="positiveInteger" use="required"/>
<attribute name="replayAvailable" type="boolean" default="false"/>
<attribute ref="xml:lang"/>
</complexType>
<complexType name="ServiceInstanceType">
  <sequence>
    <element name="DisplayName" type="mpeg7:TextualType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="RelatedMaterial" type="tva:RelatedMaterialType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ContentProtection" type="dvbisd:ContentProtectionType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="ContentAttributes" type="dvbisd:ContentAttributesType" minOccurs="0"/>
    <element name="Availability" type="dvbisd:ServiceAvailabilityType" minOccurs="0"/>
    <element name="SubscriptionPackage" type="dvbisd:SubscriptionPackageType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="FTAContentManagement" type="dvbisd:FTAContentManagementType" minOccurs="0"/>
    <element name="SourceType" type="anyURI" minOccurs="0">
      <annotation><documentation>
The use of this element is deprecated in this version of the specification, in favour of the client application making a delivery system determination based on the specified delivery parameters.
</documentation></annotation>
    </element>
    <element name="AltServiceName" type="string" minOccurs="0" maxOccurs="unbounded"/>
    <choice minOccurs="0">
      <sequence>
        <element name="DVBTDeliveryParameters" type="dvbisd:DVBTDeliveryParametersType"/>
        <element name="SATIPDeliveryParameters" type="dvbisd:SATIPDeliveryParametersType" minOccurs="0"/>
      </sequence>
      <sequence>
        <element name="DVBSDeliveryParameters" type="dvbisd:DVBSDeliveryParametersType"/>
        <element name="SATIPDeliveryParameters" type="dvbisd:SATIPDeliveryParametersType" minOccurs="0"/>
      </sequence>
    </choice>
  </sequence>
  <attribute name="priority" type="nonNegativeInteger" default="0"/>
  <attribute name="id" type="string" default="0"/>
  <attribute ref="xml:lang"/>
</complexType>
<complexType name="ContentProtectionType">
  <sequence>
    <element name="CASystemId" type="dvbisd:CASystemType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="DRMSystemId" type="dvbisd:DRMSystemType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
</complexType>
<complexType name="ProtectionSystemType" abstract="true">
    <simpleContent>
        <extension base="string">
            <attribute name="cpsIndex" type="string"/>
        </extension>
    </simpleContent>
</complexType>

<complexType name="CASystemType">
    <complexContent>
        <extension base="dvbisd:ProtectionSystemType"/>
    </complexContent>
</complexType>

<complexType name="DRMSystemType">
    <complexContent>
        <extension base="dvbisd:ProtectionSystemType">
            <attribute name="encryptionScheme" type="dvbisd:EncryptionSchemeType" use="required"/>
        </extension>
    </complexContent>
</complexType>

<simpleType name="EncryptionSchemeType">
    <restriction base="string">
        <enumeration value="cenc"/>
        <enumeration value="cbcs"/>
        <enumeration value="cbcs-10"/>
    </restriction>
</simpleType>

<complexType name="FTAContentManagementType">
    <attribute name="userDefined" type="boolean" use="required"/>
    <attribute name="doNotScramble" type="boolean" use="required"/>
    <attribute name="controlRemoteAccessOverInternet" use="required">
        <simpleType>
            <restriction base="unsignedByte">
                <minInclusive value="0"/>
                <maxInclusive value="3"/>
            </restriction>
        </simpleType>
    </attribute>
    <attribute name="doNotApplyRevocation" type="boolean" use="required"/>
</complexType>

<complexType name="ServiceProminenceListType">
    <sequence>
        <element name="Prominence" type="dvbisd:ServiceProminenceEntryType" maxOccurs="unbounded"/>
    </sequence>
</complexType>

<complexType name="ServiceProminenceEntryType">
    <simpleContent>
        <extension base="string">
            <attribute name="country" type="tva:ISO-3166-Code"/>
            <attribute name="region" type="dvbisd:RegionIdRefType"/>
            <attribute name="ranking">
                <simpleType>
                    <restriction base="integer">
                        <minInclusive value="1"/>
                        <maxInclusive value="4095"/>
                    </restriction>
                </simpleType>
            </attribute>
        </extension>
    </simpleContent>
</complexType>
<complexType name="DVBTDeliveryParametersType">
  <sequence>
    <element name="DVBTriplet" type="dvbisd:DVBTripletType"/>
    <element name="TargetCountry" type="tva:ISO-3166-Code" minOccurs="0">
      <annotation>
        <documentation>The use of this element is deprecated.</documentation>
      </annotation>
    </element>
  </sequence>
</complexType>

<complexType name="DVBSDeliveryParametersType">
  <sequence>
    <element name="DVBTriplet" type="dvbisd:DVBTripletType"/>
    <element name="OrbitalPosition" type="dvbi-types:LongitudeType" minOccurs="0"/>
    <sequence minOccurs="0">
      <element name="Frequency" type="positiveInteger"/>
      <element name="Polarization">
        <simpleType>
          <restriction base="string">
            <enumeration value="horizontal"/>
            <enumeration value="vertical"/>
            <enumeration value="left circular"/>
            <enumeration value="right circular"/>
          </restriction>
        </simpleType>
      </element>
      <sequence minOccurs="0">
        <element name="SymbolRate" type="positiveInteger"/>
        <element name="RollOff">
          <simpleType>
            <restriction base="string">
              <enumeration value="0.35"/>
              <enumeration value="0.25"/>
              <enumeration value="0.20"/>
              <enumeration value="0.15"/>
              <enumeration value="0.10"/>
              <enumeration value="0.05"/>
            </restriction>
          </simpleType>
        </element>
        <element name="ModulationSystem">
          <simpleType>
            <restriction base="string">
              <enumeration value="DVB-S"/>
              <enumeration value="DVB-S2"/>
              <enumeration value="DVB-S2X"/>
            </restriction>
          </simpleType>
        </element>
        <element name="ModulationType">
          <simpleType>
            <restriction base="string">
              <enumeration value="QPSK"/>
              <enumeration value="8PSK"/>
            </restriction>
          </simpleType>
        </element>
      </sequence>
    </sequence>
  </sequence>
</complexType>
<element name="ModcodMode">
  <simpleType>
    <restriction base="string">
      <enumeration value="ccm"/>
      <enumeration value="vcm"/>
    </restriction>
  </simpleType>
</element>

<element name="InputStreamIdentifier" type="unsignedByte" minOccurs="0"/>
<element name="ChannelBonding" minOccurs="0">
  <complexType>
    <sequence minOccurs="0">
      <annotation>
        <documentation>DVB-S2X only</documentation>
      </annotation>
      <element name="ModcodMode"/>
    </sequence>
  </complexType>
</element>
<element name="Frequency" minOccurs="2" maxOccurs="unbounded">
    <complexType>
        <simpleContent>
            <extension base="positiveInteger">
                <attribute name="primary" type="boolean" default="false"/>
            </extension>
        </simpleContent>
    </complexType>
</element>
</complexType>
</sequence>
</sequence>
</complexType>
<complexType name="SATIPDeliveryParametersType">
    <sequence>
        <element name="QueryParameters" type="string"/>
    </sequence>
</complexType>
<complexType name="DVBCDeliveryParametersType">
    <sequence>
        <element name="DVBTriplet" type="dvbisd:DVBTripletType" minOccurs="0"/>
        <element name="TargetCountry" type="tva:ISO-3166-Code" minOccurs="0">
            <annotation>
                <documentation>The use of this element is deprecated.</documentation>
            </annotation>
        </element>
        <element name="NetworkID" type="dvbi-types:NetworkIdType"/>
    </sequence>
</complexType>
<complexType name="RTSPDeliveryParametersType">
    <sequence>
        <element name="DVBTriplet" type="dvbisd:DVBTripletType"/>
        <element name="RTSPURL" type="dvbisd:RTSPURLType"/>
        <element name="MinimumBitRate" type="unsignedInt" minOccurs="0"/>
    </sequence>
</complexType>
<complexType name="MulticastTSDeliveryParametersType">
    <sequence>
        <element name="DVBTriplet" type="dvbisd:DVBTripletType" minOccurs="0"/>
        <element name="IPMulticastAddress" type="dvbisd:McastType"/>
        <element name="MinimumBitRate" type="unsignedInt" minOccurs="0"/>
    </sequence>
</complexType>
<complexType name="DASHDeliveryParametersType">
    <sequence>
        <element name="UriBasedLocation" type="dvbi-types:ExtendedURIType"/>
        <element name="MinimumBitRate" type="unsignedInt" minOccurs="0" maxOccurs="unbounded"/>  
        <element name="Extension" type="dvbi-types:ExtensionBaseType" minOccurs="0" maxOccurs="unbounded"/>
    </sequence>
</complexType>
<complexType name="IdentifierBasedDeliveryParametersType">
    <simpleContent>
        <extension base="anyURI">
            <attribute name="contentType" type="mpeg7:mimeType"/>
        </extension>
    </simpleContent>
</complexType>
<complexType name="ServiceAvailabilityType">
  <sequence>
    <element name="Period" maxOccurs="unbounded">
      <complexType>
        <sequence>
          <element name="Interval" minOccurs="0" maxOccurs="unbounded">
            <complexType>
              <attribute name="days" type="dvbisd:ServiceDaysList" default="1 2 3 4 5 6 7"/>
              <attribute name="recurrence" type="positiveInteger" default="1"/>
              <attribute name="startTime" type="dvbisd:ZuluTimeType" default="00:00:00Z"/>
              <attribute name="endTime" type="dvbisd:ZuluTimeType" default="23:59:59.999Z"/>
            </complexType>
          </element>
        </sequence>
        <attribute name="validFrom" type="dateTime"/>
        <attribute name="validTo" type="dateTime"/>
      </complexType>
    </element>
  </sequence>
</complexType>

<complexType name="ServiceDaysList">
  <list>
    <simpleType>
      <restriction base="integer">
        <minInclusive value="1"/>
        <annotation>
          <documentation xml:lang="en">Monday</documentation>
        </annotation>
        <maxInclusive value="7"/>
        <annotation>
          <documentation xml:lang="en">Sunday</documentation>
        </annotation>
      </restriction>
    </simpleType>
  </list>
</complexType>

<complexType name="ZuluTimeType">
  <restriction base="time">
    <pattern value="([01]\d|2[0-3]):[0-5]\d:[0-5]\d([\d+]?Z)"/>
  </restriction>
</complexType>

<complexType name="RegionListType">
  <sequence>
    <element name="Region" type="dvbisd:CountryRegionType" maxOccurs="unbounded"/>
  </sequence>
  <attribute name="version" type="positiveInteger" use="required"/>
</complexType>

<complexType name="CountryRegionType">
  <complexContent>
    <extension base="dvbisd:RegionBaseType">
      <sequence>
        <element name="Region" type="dvbisd:PrimaryRegionType" minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
      <attribute name="countryCodes" type="tva:ISO-3166-List" use="required"/>
    </extension>
  </complexContent>
</complexType>
<complexType name="PrimaryRegionType">
  <complexContent>
    <extension base="dvbisd:RegionBaseType">
      <sequence>
        <element name="Region" type="dvbisd:SecondaryRegionType" minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<complexType name="SecondaryRegionType">
  <complexContent>
    <extension base="dvbisd:RegionBaseType">
      <sequence>
        <element name="Region" type="dvbisd:TertiaryRegionType" minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<complexType name="TertiaryRegionType">
  <complexContent>
    <extension base="dvbisd:RegionBaseType"></extension>
  </complexContent>
</complexType>

<complexType name="RegionBaseType" abstract="true">
  <sequence>
    <element name="RegionName" type="mpeg7:TextualType" minOccurs="0" maxOccurs="unbounded"/>
    <choice minOccurs="0" maxOccurs="unbounded">
      <element name="Postcode" type="dvbisd:PostcodeType"/>
      <element name="WildcardPostcode" type="dvbisd:WildcardPostcodeType"/>
      <element name="PostcodeRange" type="dvbisd:PostcodeRangeType"/>
      <element name="Coordinates" type="dvbisd:CoordinatesType"/>
    </choice>
  </sequence>
  <attribute name="regionID" type="dvbisd:RegionIdType" use="required"/>
  <attribute name="selectable" type="boolean" default="true"/>
  <attribute ref="xml:lang"/>
</complexType>

<complexType name="RegionIdType">
  <restriction base="ID"/>
</complexType>

<complexType name="RegionIdRefType">
  <restriction base="IDREF"/>
</complexType>

<simpleType name="PostcodeType">
  <restriction base="string">
    <pattern value="&PostcodeType;"/>
  </restriction>
</simpleType>

<simpleType name="WildcardPostcodeType">
  <restriction base="string">
    <pattern value="(&PostcodeWildFirst;)|(&PostcodeWildMiddle;)|(&PostcodeWildLast;);"/>
  </restriction>
</simpleType>

<complexType name="PostcodeRangeType">
  <attribute name="from" type="dvbisd:PostcodeType" use="required"/>
</complexType>
<attribute name="to" type="dvbisd:PostcodeType" use="required"/>
</complexType>
<complexType name="CoordinatesType">
    <sequence>
        <element name="Latitude" type="dvbi-types:LatitudeType"/>
        <element name="Longitude" type="dvbi-types:LongitudeType"/>
        <element name="Radius" type="dvbi-types:RadiusType"/>
    </sequence>
</complexType>
<complexType name="LCNTableListType">
    <sequence>
        <element name="LCNTable" type="dvbisd:LCNTableType" minOccurs="0" maxOccurs="unbounded"/>
    </sequence>
</complexType>
<complexType name="LCNTableType">
    <sequence>
        <element name="TargetRegion" type="dvbisd:RegionIdRefType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="SubscriptionPackage" type="dvbisd:SubscriptionPackageType" minOccurs="0" maxOccurs="unbounded">
            <annotation><documentation>The use of this element is deprecated.</documentation></annotation>
        </element>
        <element name="LCN" type="dvbisd:LCNTableEntryType" minOccurs="0" maxOccurs="unbounded"/>
        <element name="LCNRange" type="dvbisd:LCNRangeType" minOccurs="0" maxOccurs="unbounded"/>
    </sequence>
    <attribute name="preserveBroadcastLCN" type="boolean" default="false"/>
</complexType>
<complexType name="LCNTableEntryType">
    <attribute name="channelNumber" type="positiveInteger" use="required"/>
    <attribute name="serviceRef" type="dvbi-types:ServiceIdentifierType" use="required"/>
    <attribute name="selectable" type="boolean" default="true"/>
    <attribute name="visible" type="boolean" default="true"/>
</complexType>
<complexType name="LCNRangeType">
    <attribute name="start" type="positiveInteger" use="required"/>
    <attribute name="end" type="positiveInteger"/>
    <attribute name="priority" type="nonNegativeInteger" default="0"/>
    <attribute name="fillMethod" default="startFromHighest">
        <simpleType>
            <restriction base="string">
                <enumeration value="fillGaps"/>
                <enumeration value="startFromHighest"/>
            </restriction>
        </simpleType>
    </attribute>
    <attribute name="serviceOrigin" default="dvbi">
        <simpleType>
            <restriction base="string">
                <enumeration value="any"/>
                <enumeration value="dvbi"/>
                <enumeration value="targetBroadcast"/>
                <enumeration value="otherBroadcast"/>
            </restriction>
        </simpleType>
    </attribute>
</complexType>
<complexType name="SubscriptionPackageType">
    <simpleContent>
        <extension base="mpeg7:TextualType"/>
    </simpleContent>
</complexType>
<complexType name="SubscriptionPackageListType">
  <sequence>
    <element name="SubscriptionPackage" type="dvbisd:SubscriptionPackageType" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
  <attribute name="allowNoPackage" type="boolean" default="true"/>
</complexType>

<complexType name="DASHPlaylistType">
  <sequence>
    <element name="PlaylistEntry" type="anyURI" maxOccurs="unbounded"/>
  </sequence>
</complexType>

<complexType name="NVODType">
  <attribute name="mode" use="required">
    <simpleType>
      <restriction base="string">
        <enumeration value="reference"/>
        <enumeration value="timeshifted"/>
      </restriction>
    </simpleType>
  </attribute>
  <attribute name="reference" type="dvbi-types:ServiceIdentifierType"/>
  <attribute name="offset" default="PT0S">
    <simpleType>
      <restriction base="duration">
        <minInclusive value="PT0S"/>
      </restriction>
    </simpleType>
  </attribute>
</complexType>

<complexType name="VideoAttributesType">
  <complexContent>
    <extension base="tva:VideoAttributesType">
      <sequence>
        <element name="Colorimetry" type="tva:ControlledTermType" minOccurs="0"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<complexType name="ContentAttributesType">
  <sequence>
    <element name="AudioAttributes" type="tva:AudioAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="AudioConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="unbounded">
      <annotation><documentation>The use of this element is deprecated.</documentation></annotation>
    </element>
    <element name="VideoAttributes" type="dvbisd:VideoAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="VideoConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="AccessibilityAttributes" type="tva:AccessibilityAttributesType" minOccurs="0"/>
  </sequence>
</complexType>

<complexType name="ContentAttributesType">
  <sequence>
    <element name="AudioAttributes" type="tva:AudioAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="AudioConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="unbounded">
      <annotation><documentation>The use of this element is deprecated.</documentation></annotation>
    </element>
    <element name="VideoAttributes" type="dvbisd:VideoAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="VideoConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="AccessibilityAttributes" type="tva:AccessibilityAttributesType" minOccurs="0"/>
  </sequence>
</complexType>

<complexType name="ContentAttributesType">
  <sequence>
    <element name="AudioAttributes" type="tva:AudioAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="AudioConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="unbounded">
      <annotation><documentation>The use of this element is deprecated.</documentation></annotation>
    </element>
    <element name="VideoAttributes" type="dvbisd:VideoAttributesType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="VideoConformancePoint" type="tva:ControlledTermType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="AccessibilityAttributes" type="tva:AccessibilityAttributesType" minOccurs="0"/>
  </sequence>
</complexType>

<!-- items from SDnS v1.2.1 -->

<!-- items copied from SDnS v1.4 -->
<simpleType name="DomainType">
  <restriction base="string">
    <pattern value="([\.|\n|\r]*?\([\.|\n|\r]*\))?\([\.|\n|\r]+\)/
  </restriction>
</simpleType>
<complexType name="McastType">
  <sequence minOccurs="0">
    <element name="FECBaseLayer" type="dvbisd:FECLayerAddressType" minOccurs="0"/>
    <element name="FECEnhancementLayer" type="dvbisd:FECLayerAddressType" minOccurs="0" maxOccurs="unbounded"/>
    <element name="CNAME" type="string" minOccurs="0"/>
    <element name="ssrc" type="unsignedInt" minOccurs="0"/>
    <element name="RTPRetransmission" type="dvbisd:RETInfoType" minOccurs="0"/>
  </sequence>
  <attributeGroup ref="dvbisd:MulticastAddressAttributes"/>
</complexType>
<complexType name="FECLayerAddressType">
  <attribute name="Address" type="dvbisd:IPOrDomainType" use="optional"/>
  <attribute name="Source" type="dvbisd:IPOrDomainType" use="optional"/>
  <attribute name="Port" type="unsignedShort" use="optional"/>
  <attribute name="MaxBitrate" type="positiveInteger" use="optional"/>
  <attribute name="RTSPControlURL" type="anyURI" use="optional"/>
  <attribute name="PayloadTypeNumber" type="unsignedInt" use="optional"/>
  <attribute name="TransportProtocol" type="dvbisd:TransportProtocolType" use="optional"/>
</complexType>
<complexType name="RETInfoType">
  <sequence>
    <element name="RTCPReporting" type="dvbisd:RTCPReportingType"/>
    <element name="UnicastRET" type="dvbisd:UnicastRETType" minOccurs="0"/>
    <element name="MulticastRET" type="dvbisd:MulticastRETType" minOccurs="0"/>
  </sequence>
</complexType>
<attributeGroup name="FECAttributeGroupType">
  <attribute name="FECMaxBlockSize" type="unsignedShort" use="optional"/>
  <attribute name="FECMaxBlockTime" type="unsignedShort" use="optional"/>
  <attribute name="FECOTI" type="base64Binary" use="optional"/>
</attributeGroup>
<attributeGroup name="BasicMulticastAddressAttributesType">
  <attribute name="Source" type="dvbisd:IPOrDomainType" use="optional"/>
  <attribute name="Address" type="dvbisd:IPOrDomainType" use="required"/>
  <attribute name="Port" type="unsignedShort" use="required"/>
</attributeGroup>
<attributeGroup name="MulticastAddressAttributes">
  <attributeGroup ref="dvbisd:BasicMulticastAddressAttributesType"/>
  <attributeGroup ref="dvbisd:FECAttributeGroupType"/>
</attributeGroup>
<complexType name="IPOrDomainType">
  <annotation>
    <documentation xml:lang="en">union of DomainType and IPType</documentation>
  </annotation>
  <union memberTypes="dvbisd:IPType dvbisd:DomainType"/>
</complexType>
<complexType name="StreamingType">
  <restriction base="string">
    <enumeration value="rtp"/>
    <enumeration value="udp"/>
  </restriction>
</complexType>
<complexType name="RTCPReportingType">
  <attribute name="DestinationAddress" type="string" use="required"/>
  <attribute name="DestinationPort" type="unsignedShort" use="optional"/>
  <attribute name="dvb-t-ret" type="positiveInteger" use="optional"/>
  <attribute name="rtcp-bandwidth" type="positiveInteger" use="optional"/>
  <attribute name="rtcp-rsize" type="positiveInteger" use="optional"/>
  <attribute name="trr-int" type="positiveInteger" use="optional"/>
  <attribute name="dvb-disable-rtcp-rr" type="boolean" use="optional" default="false"/>
  <attribute name="dvb-enable-byte" type="boolean" use="optional" default="false"/>
  <attribute name="dvb-t-wait-min" type="unsignedInt" use="optional" default="0"/>
  <attribute name="dvb-t-wait-max" type="unsignedInt" use="optional" default="0"/>
  <attribute name="dvb-srcs-bitmask" type="dvbisd:Hexadecimal32bit" use="optional" default="ffffffff"/>
  <attribute name="dvb-rsi-mc-ret" type="boolean" use="optional"/>
  <attribute name="dvb-ssrc-upstream-client" type="positiveInteger" use="optional"/>
</complexType>
</complexType>
</complexType>
</complexType>
<complexType name="RTSPURLType">
  <simpleContent>
  </complexType>
</complexType>
A.2 DVB-I Service List Discovery schema

<?xml version="1.0" encoding="UTF-8"?>
A.3 DVB-I Data Types schema

<?xml version="1.0" encoding="UTF-8"?>
<element name="DASHDelivery" type="dvbi-types:NoAdditionalIPParametersType" minOccurs="0"/>
<element name="DVBTDelivery" type="dvbi-types:DVBTDeliveryType" minOccurs="0" maxOccurs="unbounded"/>
<element name="DVBSDelivery" type="dvbi-types:DVBSDeliveryType" minOccurs="0" maxOccurs="unbounded"/>
<element name="DVBCDelivery" type="dvbi-types:DVBCDeliveryType" minOccurs="0" maxOccurs="unbounded"/>
<element name="DVBSDelivery" type="dvbi-types:DVBSDeliveryType" minOccurs="0" maxOccurs="unbounded"/>
<element name="RTSPDelivery" type="dvbi-types:NoAdditionalIPParametersType" minOccurs="0"/>
<element name="MulticastTSDelivery" type="dvbi-types:NoAdditionalIPParametersType" minOccurs="0"/>
<element name="ApplicationDelivery" type="dvbi-types:ApplicationDeliveryTypeListType" minOccurs="0" maxOccurs="unbounded"/>
<element name="OtherDeliveryParameters" type="dvbi-types:ExtensionBaseType" minOccurs="0" maxOccurs="unbounded"/>
</sequence>
</complexType>
<complexType name="AbstractDeliveryType" abstract="true">
<attribute name="required" type="boolean" default="false"/>
</complexType>
<complexType name="AbstractIPDeliveryType" abstract="true">
<complexContent>
<extension base="dvbi-types:AbstractDeliveryType">
<attribute name="minimumBitRate" type="unsignedInt"/>
</extension>
</complexContent>
</complexType>
<complexType name="NoAdditionalIPParametersType">
<complexContent>
<extension base="dvbi-types:AbstractIPDeliveryType">
<!-- no additional elements or attributes -->
</extension>
</complexContent>
</complexType>
<complexType name="DVBTDeliveryType">
<complexContent>
<extension base="dvbi-types:AbstractIPDeliveryType">
<sequence>
<element name="OriginalNetworkID" type="dvbi-types:NetworkIdType" minOccurs="0" maxOccurs="unbounded"/>
</sequence>
<attribute name="originalNetworkID" type="dvbi-types:NetworkIdType" use="optional">
<annotation><documentation>The use of this attribute is deprecated.</documentation></annotation>
</attribute>
</extension>
</complexContent>
</complexType>
<complexType name="DVBCDeliveryType">
<complexContent>
<extension base="dvbi-types:AbstractIPDeliveryType">
<attribute name="networkID" type="dvbi-types:NetworkIdType" use="required"/>
</extension>
</complexContent>
</complexType>
<complexType name="DVBSDeliveryType">
<complexContent>
<extension base="dvbi-types:AbstractDeliveryType">
<sequence>
<element name="OrbitalPosition" type="dvbi-types:LongitudeType" maxOccurs="unbounded"/>
</sequence>
<attribute name="originalNetworkID" type="dvbi-types:NetworkIdType" use="optional">
<annotation>
<documentation>The use of this attribute is deprecated.</documentation></annotation>
</attribute>
</extension>
</complexContent>
</complexType>
<complexType name="DVBSDeliveryType">
<complexContent>
<extension base="dvbi-types:AbstractDeliveryType">
<attribute name="networkID" type="dvbi-types:NetworkIdType" use="required"/>
</extension>
</complexContent>
</complexType>
<complexType name="DVBSDeliveryType">
<complexContent>
<extension base="dvbi-types:AbstractDeliveryType">
<sequence>
<element name="OrbitalPosition" type="dvbi-types:LongitudeType" maxOccurs="unbounded"/>
</sequence>
<attribute name="originalNetworkID" type="dvbi-types:NetworkIdType" use="optional">
<annotation>
<documentation>The use of this attribute is deprecated.</documentation></annotation>
</attribute>
</extension>
</complexContent>
</complexType>
<complexType name="ApplicationTypeListType">
  <complexContent>
    <extension base="dvbi-types:AbstractDeliveryType">
      <sequence>
        <element name="ApplicationType" type="dvbi-types:ApplicationType" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<complexType name="ApplicationType">
  <attribute name="contentType" type="mpeg7:mimeType" use="required"/>
  <attribute name="xmlAitApplicationType" type="mpeg7:mimeType"/>
</complexType>

<complexType name="ExtendedURIPathType">
  <sequence>
    <element name="URI">
      <simpleType>
        <restriction base="anyURI">
          <pattern value=".+/"/>
        </restriction>
      </simpleType>
    </element>
  </sequence>
  <attribute name="contentType" type="mpeg7:mimeType" use="required"/>
</complexType>

<complexType name="DVBTripletType">
  <attribute name="origNetId" type="dvbi-types:OrigNetId" use="optional"/>
  <attribute name="tsId" type="dvbi-types:TSId" use="optional"/>
  <attribute name="serviceId" type="dvbi-types:ServiceId" use="required"/>
</complexType>

<simpleType name="OrigNetId">
  <annotation>
    <documentation xml:lang="en">
      A unique identifier of a network. This is managed by DVB through ETSI
    </documentation>
  </annotation>
  <restriction base="unsignedShort"/>
</simpleType>

<simpleType name="TSId">
  <annotation>
    <documentation xml:lang="en">
      A number used to identify Transport Stream within an original_network.
    </documentation>
  </annotation>
  <restriction base="unsignedShort"/>
</simpleType>

<simpleType name="ServiceId">
  <annotation>
    <documentation xml:lang="en">
      A number used to identify a service within a Transport Stream.
    </documentation>
  </annotation>
</simpleType>
A.4 XML AIT extension schema

```xml
<?xml version="1.0" encoding="UTF-8"?>
targetNamespace="urn:dvb:metadata:dvb:linkedapplication:xmlait:2023" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <import namespace="urn:dvb:mhp:2009" schemaLocation="xmlait/mis_xmlait.xsd"/>
  <import namespace="urn:tva:mpeg7:2008" schemaLocation="xmlait/tva_mpeg7_2008.xsd"/>
  <complexType name="DVBIApplicationDescriptor">
    <complexContent>
      <extension base="mhp:ApplicationDescriptor">
        <sequence>
          <element name="Description" type="mpeg7:TextualType" minOccurs="0"/>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</schema>
```
Annex B (normative):
Electronic Attachments

The present document includes the following electronic attachments contained in archive A177r3-electronic-attachments.zip which accompanies the present document:

- **dvbi_service_list_discovery_v1.6.xsd** - The Service List discovery schema (see clause 5.1.3) as shown in clause A.2
- **dvbi_v6.0.xsd** - The Service List schema (see clauses 5.4 and 5.5) as shown in clause A.1
- **dvbi_types_v1.0.xsd** - Datatypes used in Service List and Service List discovery schemas, and concrete types for service list extensions. See clause A.3.
- **dvbi_xmlait_extension_v1.0.xsd** - An extension of the XML AIT datatype to permit additional DVB-I related information to be specified.
- **DVBColorimetryCS-2020.xml** - Defines terms representing the colorimetry used in a service or program (see clause D.6)
- **DVBCtentSubjectCS-2019.xml** - Additional service or programme genres (see clause D.5)
- **DVBSHowRelatedCS-2021.xml** - Defines terms used in HowRelated elements (see clause D.1)
- **DVBLinkedApplicationCS-2019.xml** - Defines the application launching methods (see clause D.2)
- **DVBRercordingInfoCS-2019.xml** - Defines the time-shift or recording options available (see clause D.3)
- **DVBSerticeTypeCS-2019.xml** - Defines the identifiers for the representation of a service (see clause D.4)
- **tva_metadata_3-1.xsd** - TV-Anytime schema
- **tva_mpeg7.xsd** - TV-Anytime profile of MPEG-7 schema
- **examples/Box Set Categories Response.xml** - Example of a response from the Content Guide Server to a Box Set Categories request (see clauses 6.8.2.2 and 6.8.2.3)
- **examples/Box Set Contents Response.xml** - Example of a response from the Content Guide Server to a Box Set Contents request (see clauses 6.8.4.2 and 6.8.4.3)
- **examples/Box Set Lists Response.xml** - Example of a response from the Content Guide Server to a Box Set Lists request (see clauses 6.8.3.2 and 6.8.3.3)
- **examples/Content Guide Source.xml** - Example of Content Guide Server endpoints in a minimal Service List (see clause 6.4)
- **examples/Detailed Program Information Response.xml** - Example of a response from the Content Guide Server to a Programme Information request (see clause 6.6)
- **examples/Extended XMLAIT.xsd** - Example of an XML AIT used to signal a service provider homepage.
- **examples/Italy Regional Inserts.xml** - Example Service List with broadcast content supplemented with regional broadband delivery at certain times
- **examples/More Episodes Response.xml** - Example of a response from the Content Guide Server to a More Episodes request (see clause 6.7)
- **examples/Playlist.xml** - Example MPD playlist when the DASH Delivery Type is signalled as application/xml
• examples/Regions (Range and Postcode).xml - Example region definitions using individual postcodes and ranges of postcodes
• examples/Regions (Range and Wildcard).xml - Example region definitions using ranges of postcodes and wildcarded postcodes (see clause 5.6)
• examples/SAT-IP.xml - Example Service List containing SAT>IP delivery parameters (see clause 5.5.18.7)
• examples/Schedule NowNext Response.xml - Example of a response from the Content Guide Server to a Now/Next Filtered Schedule request (see clause 6.5.3)
• examples/Schedule NowNext Window Response.xml - Example of a response from the Content Guide Server to a Now/Next Window Filtered Schedule request (see clause 6.5.3)
• examples/Schedule Response.xml - Example of a response from the Content Guide Server to a Timestamp Filtered Schedule request (see clause 6.5.2)
• examples/Service List Access Services.xml – Example of a Service List including signalling for access services (see clause 4.5.4)
• examples/Service List Registry Response (DE or AT and English).xml - Example Service List Registry response for German and Austrian Service Lists with English language Services (see clause 5.1.3)
• examples/Service List Registry Response (error).xml - Example Service List Registry response where no Service List matches the query (see clause 5.1.3)
• examples/Service List Registry Response (IT and Regulated).xml - Example Service List Registry response for the Italian regulated Service List (see clause 5.1.3)
• examples/Service List Registry Response (IT, Regulated, DVB-T).xml – Example Service List Registry response for the Italian terrestrial regulated Service List (see clause 5.1.3)
• examples/Service List Access Services.xml – Example Service List including signalling for access services (see clause 4.5.4).
• xmlait/mis_xmlait.xsd - The XML AIT schema.
• xmlait/sdns_v1.4r13.xsd - The DVB service discovery and selection schema version 1.4 imported into the XML AIT schema.
• xmlait/sdns_v1.5r25b.xsd - The DVB service discovery and selection schema version 1.5 imported into the XML AIT schema.
• xmlait/tva_metadata_3-1_v131.xsd - the TV Anytime metadata schema version 1.3.1 used by version 1.4 of the DVB service discovery and selection schema.
• xmlait/tva_metadata_3-1_v171.xsd - the TV Anytime metadata schema version 1.7.1 used by version 1.5 of the DVB service discovery and selection schema.
• xmlait/tva_mpeg7_2005.xsd - The version of the MPEG-7 datatypes schema used by the TV Anytime metadata schema version 1.3.1.
• xmlait/tva_mpeg7_2008.xsd - The version of the MPEG-7 datatypes schema used by the TV Anytime metadata schema version 1.7.1.
Annex C (informative):
Examples

C.1 Regional Inserts

Use case: a broadcast service (e.g. DVB-S) carries national content for most of the day, and regional content during regular daily time windows. Instead of broadcasting all regional variants, the regional contents are delivered as DVB-DASH services, allowing the DVB-I client to replace the national broadcast content during those time windows.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ServiceList version="1" xml:lang="en" id="tag:dvb.org,2023:example-italy-inserts"
xmlns="urn:dvb:metadata:servicediscovery:2024"
xmlns:dvbi-types="urn:dvb:metadata:servicediscovery-types:2023"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:dvb:metadata:servicediscovery:2024 ../dvbi_v6.0.xsd">
  <Name>Italian public broadcasting company 3 example</Name>
  <ProviderName>Italian public broadcasting company</ProviderName>
  <RegionList Version="1">
    <Region countryCodes="ITA" regionID="Italy">
      <Region regionID="Piemonte">
        <RegionName>Piemonte</RegionName>
        <PostcodeRange from="15010" to="15122"/>
        <PostcodeRange from="14010" to="14100"/>
        <PostcodeRange from="13811" to="13900"/>
        <PostcodeRange from="12010" to="12025"/>
        <PostcodeRange from="28010" to="28100"/>
        <PostcodeRange from="10100" to="10156"/>
        <PostcodeRange from="28801" to="28925"/>
        <PostcodeRange from="13010" to="13100"/>
      </Region>
      <Region regionID="Lombardia">
        <RegionName>Lombardia</RegionName>
        <PostcodeRange from="24010" to="24129"/>
        <PostcodeRange from="25010" to="25136"/>
        <PostcodeRange from="22010" to="22100"/>
        <PostcodeRange from="26010" to="26100"/>
        <PostcodeRange from="23081" to="23900"/>
        <PostcodeRange from="26811" to="26900"/>
        <PostcodeRange from="46010" to="46100"/>
        <PostcodeRange from="20010" to="20162"/>
        <PostcodeRange from="20811" to="20900"/>
        <PostcodeRange from="27010" to="27100"/>
        <PostcodeRange from="23010" to="23100"/>
      </Region>
    </RegionList>
    <LCNTableList>
      <LCNTable>
        <TargetRegion>Piemonte</TargetRegion>
        <LCN channelNumber="3" serviceRef="tag:rai.it,2019:rai-3-piemonte"/>
      </LCNTable>
      <LCNTable>
        <TargetRegion>Lombardia</TargetRegion>
        <LCN channelNumber="3" serviceRef="tag:rai.it,2019:rai-3-lombardia"/>
      </LCNTable>
    </LCNTableList>
  </RegionList>
</ServiceList>
```
<Service version="1">
  <UniqueIdentifier>tag:rai.it,2019:rai-3-piemonte</UniqueIdentifier>
  <ServiceInstance priority="2">
    <DVBSDeliveryParameters>
      <DVBTriplet origNetId="318" tsId="5200" serviceId="3403"/>
      <OrbitalPosition>-5</OrbitalPosition>
      <Frequency>1117900</Frequency>
      <Polarization>vertical</Polarization>
    </DVBSDeliveryParameters>
  </ServiceInstance>
  <ServiceInstance priority="1">
    <DisplayName>Rai 3 Regional Piemonte</DisplayName>
    <Availability>
      <Period>
        <Interval startTime="17:30:00Z" endTime="18:00:00Z" days="1 2 3 4 5 6 7"/>
      </Period>
    </Availability>
    <DASHDeliveryParameters>
      <UriBasedLocation contentType="application/dash+xml">
        <dvbi-types:URI>
          https://www.raiplay.it/dvbi/mpd/rai3_tgr_piemonte.mpd</dvbi-types:URI>
        </UriBasedLocation>
      </DASHDeliveryParameters>
  </ServiceInstance>
  <ServiceName>Rai 3</ServiceName>
  <ProviderName>Italian public broadcasting company</ProviderName>
</Service>

<Service version="1">
  <UniqueIdentifier>tag:rai.it,2019:rai-3-lombardia</UniqueIdentifier>
  <ServiceInstance priority="2">
    <DVBSDeliveryParameters>
      <DVBTriplet origNetId="318" tsId="5200" serviceId="3403"/>
    </DVBSDeliveryParameters>
  </ServiceInstance>
  <ServiceInstance priority="1">
    <DisplayName>Rai 3 Regional Lombardia</DisplayName>
    <Availability>
      <Period>
        <Interval startTime="17:30:00Z" endTime="18:00:00Z" days="1 2 3 4 5 6 7"/>
      </Period>
    </Availability>
    <DASHDeliveryParameters>
      <UriBasedLocation contentType="application/dash+xml">
        <dvbi-types:URI>
          https://www.raiplay.it/dvbi/mpd/rai3_tgr_lombardia.mpd</dvbi-types:URI>
        </UriBasedLocation>
      </DASHDeliveryParameters>
  </ServiceInstance>
  <ServiceName>Rai 3</ServiceName>
  <ProviderName>Italian public broadcasting company</ProviderName>
</Service>
</ServiceList>
C.2 SAT>IP

The following example shows a Service List with one region definition "Saarland" in Germany. The region is defined via a list of postcodes and postcode ranges. The LCN entry for one service and the region Saarland is 1.

There is one service entry, whose service name is "Das Erste" with 3 service instances:

- **Instance 1**
  - DVB-S/S2 in HD (highest priority)
  - This instance carries the attributes AC3 for audio and H264 for Video
  - The displayed name is "Das Erste HD"
  - **SATIPDeliveryParameters** are included

- **Instance 2**
  - DVB-S in SD
  - This instance has the attributes MPEG-1 Layer II for audio and MPEG-2 for Video
  - The displayed name is "Das Erste"
  - **SATIPDeliveryParameters** are included

- **Instance 3**
  - DASH Delivery in SD (DVB-I DASH)
  - The displayed name is "Das Erste"

```xml
<?xml version="1.0" encoding="UTF-8"?>
  <Name>Germany FTA Example</Name>
  <ProviderName>SES</ProviderName>
  <RegionList version="1">
    <Region countryCodes="DEU" regionID="Deutschland">
      <Region regionID="Saarland">
        <PostcodeRange from="66111" to="66133"/>
        <Postcode>66265</Postcode>
        <Postcode>66271</Postcode>
        <Postcode>66280</Postcode>
        <Postcode>66287</Postcode>
        <Postcode>66292</Postcode>
        <Postcode>66299</Postcode>
        <Postcode>66333</Postcode>
        <Postcode>66346</Postcode>
        <Postcode>66352</Postcode>
        <Postcode>66359</Postcode>
        <Postcode>66386</Postcode>
        <Postcode>66399</Postcode>
        <Postcode>66424</Postcode>
        <Postcode>66440</Postcode>
      </Region>
    </Region>
  </RegionList>
</ServiceList>
```
<RegionList>
  <Region>
    <TargetRegion>Deutschland</TargetRegion>
    <LCN channelNumber="1" serviceRef="tag:daserste.de,2019:DasErste"/>
  </Region>
  <Region>
    <TargetRegion>Saarland</TargetRegion>
    <LCN channelNumber="1" serviceRef="tag:daserste.de,2019:DasErste"/>
  </Region>
</RegionList>

<Service version="1">
  <UniqueIdentifier>tag:daserste.de,2019:DasErste</UniqueIdentifier>
  <ServiceInstance priority="1">
    <DisplayName>Das Erste HD</DisplayName>
    <ContentAttributes>
      <AudioAttributes>
227

  <tv:Name>AC3</tv:Name>
</tv:Coding>
</AudioAttributes>
</VideoAttributes>
</ContentAttributes>
</DVBSDeliveryParameters>
<DVBTriplet origNetId="1" tsId="1019" serviceId="10301"/>
<OrbitalPosition>19.2</OrbitalPosition>
<Frequency>1149400</Frequency>
<Polarization>horizontal</Polarization>
</DVBSDeliveryParameters>
<SATIPDeliveryParameters>
<QueryParameters>
  freq=11494&pol=h&ro=0.35&msys=dvbs2&mtype=8psk&plts=on&
  sr=22000&fec=23&pids=0,17,18,5100,5101,5102,5104
</QueryParameters>
</SATIPDeliveryParameters>
</ServiceInstance>
<ServiceInstance priority="2">
  <DisplayName>Das Erste</DisplayName>
  <ContentAttributes>
    <AudioAttributes>
      <tv:Coding href="urn:mpeg:mpeg7:cs:AudioCodingFormatCS:2001:3.2">
        <tv:Name>MPEG-1 Audio Layer II</tv:Name>
      </tv:Coding>
    </AudioAttributes>
    <AudioAttributes>
        <tv:Name>AC3</tv:Name>
      </tv:Coding>
    </AudioAttributes>
    <VideoAttributes>
      <tv:Coding href="urn:mpeg:mpeg7:cs:VisualCodingFormatCS:2001:2.2.2">
        <tv:Name>MPEG-2 Video Main Profile @ Main Level</tv:Name>
      </tv:Coding>
    </VideoAttributes>
  </ContentAttributes>
  <DVBSDeliveryParameters>
    <DVBTriplet origNetId="1" tsId="1101" serviceId="28106"/>
    <OrbitalPosition>19.2</OrbitalPosition>
    <Frequency>1183600</Frequency>
    <Polarization>horizontal</Polarization>
  </DVBSDeliveryParameters>
  <SATIPDeliveryParameters>
    <QueryParameters>
      freq=11836&pol=h&ro=0.35&msys=dvbs&mtype=8psk&plts=off
      &sr=27500&fec=34&pids=0,17,18,100,101,102,104
    </QueryParameters>
  </SATIPDeliveryParameters>
</ServiceInstance>
<ServiceInstance priority="3"/>
C.3 Content Guide Source

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ServiceList xmlns="urn:dvb:metadata:servicediscovery:2024"
    version="1" xml:lang="en" id="tag:dvb.org,2023:example-cg-sample"
    xmlns:dvb="urn:dvb:metadata:2023"
    xsi:schemaLocation="urn:dvb:metadata:2023 ../dvbi_v6.0.xsd
    urn:tva:metadata:2024 ../tva_metadata_3-1.xsd">
    <Name xml:lang="en">Content Guide Source example</Name>
    <ProviderName xml:lang="en">Content Guide Source</ProviderName>
    <ContentGuideSourceList>
        <ContentGuideSource CGSID="cgs-dvbi-01">
            <Name xml:lang="en">A-Z Content Guide</Name>
            <ProviderName xml:lang="en">A-Z Metadata</ProviderName>
            <RelatedMaterial>
                <tva:MediaLocator>
                    <tva:MediaUri contentType="image/png">
                        https://cgs.az.metadata/static/logo.png
                    </tva:MediaUri>
                </tva:MediaLocator>
            </RelatedMaterial>
            <ScheduleInfoEndpoint contentType="application/xml">
                <dvb:URI>https://cgs.az.metadata/schedule</dvb:URI>
            </ScheduleInfoEndpoint>
            <ProgramInfoEndpoint contentType="application/xml">
                <dvb:URI>https://cgs.az.metadata/program</dvb:URI>
            </ProgramInfoEndpoint>
            <GroupInfoEndpoint contentType="application/xml">
                <dvb:URI>https://cgs.az.metadata/group</dvb:URI>
            </GroupInfoEndpoint>
        </ContentGuideSource>
    </ContentGuideSourceList>
</ServiceList>
```
C.4 Responses to queries to a Service List Registry for Service List discovery

Example of response to query:

<?xml version="1.0" encoding="UTF-8"?>
  <ServiceListRegistryEntity regulatorFlag="true">
    <Name>DVB Services Sàrl</Name>
    <Address>
      <mpeg7:Name>John Doe</mpeg7:Name>
      <mpeg7:PostalAddress>
        <mpeg7:AddressLine>Geneva, Switzerland</mpeg7:AddressLine>
      </mpeg7:PostalAddress>
    </Address>
    <ElectronicAddress>
      <mpeg7:Telephone>+41 22 0000000</mpeg7:Telephone>
      <mpeg7:Email>dvbi_csr@dvbservices.com</mpeg7:Email>
      <mpeg7:Url>csr.dvbservices.com</mpeg7:Url>
    </ElectronicAddress>
  </ServiceListRegistryEntity>
  <ProviderOffering>
    <Provider>
      <Name>AGCOM</Name>
      <Address>
        <mpeg7:Name>John Doe</mpeg7:Name>
        <mpeg7:PostalAddress>
          <mpeg7:AddressLine>Roma, Italy</mpeg7:AddressLine>
        </mpeg7:PostalAddress>
      </Address>
      <ElectronicAddress>
        <mpeg7:Telephone>+39 06 0000000</mpeg7:Telephone>
        <mpeg7:Email>dvbi@agcom.it</mpeg7:Email>
      </ElectronicAddress>
    </Provider>
    <ServiceListOffering regulatorListFlag="true">
      <ServiceListName>Italian Trusted Services</ServiceListName>
      <ServiceListURI contentType="application/vnd.dvb.dvbisl+xml">
        <dvbi-types:URI>https://dvbi.italian-authority.it/trusted-services-dtt.xml</dvbi-types:URI>
      </ServiceListURI>
      <Delivery>
        <DASHDelivery/>
        <DVBTDelivery required="true"/>
      </Delivery>
      <Language>it</Language>
      <TargetCountry>ITA</TargetCountry>
    </ServiceListOffering>
  </ProviderOffering>
</ServiceListEntryPoints>
Example of response to query:

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ServiceListRegistryEntity SYSTEM "../dvbi_service_list_discovery_v1.6.xsd">
<ServiceListEntryPoints xml:lang="en" xmlns="urn:dvb:metadata:servicelistdiscovery:2024"
xmlns:dvbisd="urn:dvb:metadata:servicediscovery:2024"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:dvb:metadata:servicelistdiscovery:2024 ../dvbi_service_list_discovery_v1.6.xsd">
<ServiceListRegistryEntity>
  <Name>A Private Service List Registry</Name>
  <ElectronicAddress>
    <mpeg7:Email>info@private-service-list-registry.com</mpeg7:Email>
    <mpeg7:Url>dvbisr.private-service-list-registry.com</mpeg7:Url>
  </ElectronicAddress>
</ServiceListRegistryEntity>
<ServiceListRegistryEntity>
  <Name>TV from the World</Name>
  <Address>
    <mpeg7:Name>John Doe</mpeg7:Name>
    <mpeg7:PostalAddress>
      <mpeg7:AddressLine>U.S.</mpeg7:AddressLine>
    </mpeg7:PostalAddress>
  </Address>
  <ElectronicAddress>
    <mpeg7:Telephone>+1 555 000000</mpeg7:Telephone>
    <mpeg7:Email>dvbi_lists@TVfromTheWorld.com</mpeg7:Email>
  </ElectronicAddress>
</ServiceListRegistryEntity>
</ServiceListEntryPoints>
<ServiceListName xml:lang="fr">Télévision du monde en anglais</ServiceListName>
<ServiceListName xml:lang="it">TV del mondo in inglese</ServiceListName>
<ServiceListURI contentType="application/vnd.dvb.dvbi-sl+xml">
  <dvbi-types:URI>
    https://dvbi.TVfromTheWorld.com/engTVservices.xml</dvbi-types:URI>
</ServiceListURI>
<Delivery>
  <DASHDelivery required="true"/>
</Delivery>
<Language>en</Language>
<!-- Assumption: if TargetCountry is not specified, the service list is assumed to be targeted to any country -->
<ServiceListId>tag:dvb.org,2023:example-world-tv</ServiceListId>
</ServiceListOffering>
<ServiceListOffering>
  <ServiceListName xml:lang="de">TV aus Deutschland</ServiceListName>
  <ServiceListName xml:lang="en">TV from Germany</ServiceListName>
  <ServiceListURI contentType="application/vnd.dvb.dvbi-sl+xml">
    <dvbi-types:URI>
      https://dvbi.TVfromTheWorld.com/TVservices_Germany.xml</dvbi-types:URI>
  </ServiceListURI>
  <Delivery>
    <DASHDelivery required="true"/>
  </Delivery>
  <Language>de</Language>
  <Language>en</Language>
  <TargetCountry>DEU</TargetCountry>
  <ServiceListId>tag:dvb.org,2023:example-germany-tv</ServiceListId>
</ServiceListOffering>
</ProviderOffering>
<ProviderOffering>
  <Provider>
    <Name>British DVB-I</Name>
    <Address>
      <mpeg7:Name>John Doe</mpeg7:Name>
      <mpeg7:PostalAddress>
        <mpeg7:AddressLine>London, UK</mpeg7:AddressLine>
      </mpeg7:PostalAddress>
    </Address>
    <ElectronicAddress>
      <mpeg7:Telephone>+44 020 00000000</mpeg7:Telephone>
      <mpeg7:Email>dvbi@british-service-list-provider.co.uk</mpeg7:Email>
    </ElectronicAddress>
  </Provider>
  <ServiceListOffering>
    <ServiceListName>Documentaries</ServiceListName>
    <ServiceListURI contentType="application/vnd.dvb.dvbi-sl+xml">
      <dvbi-types:URI>
        https://www.british-service-list-provider.co.uk/documentaries.xml
      </dvbi-types:URI>
    </ServiceListURI>
  </ServiceListOffering>
</ProviderOffering>
<ServiceListOffering>
  <ServiceListName>Documentaries</ServiceListName>
  <ServiceListURI contentType="application/vnd.dvb.dvbi-sl+xml">
    <dvbi-types:URI>
      https://alt.british-service-list-provider.co.uk/documentaries.xml
    </dvbi-types:URI>
  </ServiceListURI>
</ServiceListOffering>
Example of response to query including a delivery medium:
https://csr.dvbservices.com/query?TargetCountry=ITA&regulatorListFlag=true&Delivery%5B%5D=dvb-dash&Delivery%5B%5D=dvb-t
or
https://csr.dvbservices.com/query?TargetCountry=ITA&regulatorListFlag=true&Delivery=dvb-t

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!-- Example of response to query:
<ServiceListRegistryEntity regulatorFlag="true">
  <Name>DVB Services Sàrl</Name>
  <Address>
    <mpeg7:Name>John Doe</mpeg7:Name>
    <mpeg7:PostalAddress>
      <mpeg7:AddressLine>Geneva, Switzerland</mpeg7:AddressLine>
    </mpeg7:PostalAddress>
  </Address>
  <ElectronicAddress>
    <mpeg7:Telephone>+41 22 0000000</mpeg7:Telephone>
    <mpeg7:Email>dvbi_csr@dvbservices.com</mpeg7:Email>
    <mpeg7:Url>csr.dvbservices.com</mpeg7:Url>
  </ElectronicAddress>
</ServiceListRegistryEntity>
<ProviderOffering>
  <Name>AGCOM</Name>
  <Address>
    <mpeg7:Name>John Doe</mpeg7:Name>
    <mpeg7:PostalAddress>
      <mpeg7:AddressLine>Roma, Italy</mpeg7:AddressLine>
    </mpeg7:PostalAddress>
  </Address>
</ProviderOffering>
</ServiceListEntryPoints>
```
Example of response to a query not matching any entry:
https://dvbisr.private-service-list-registry.com/query?ProviderName=NotExistingProvider

<?xml version="1.0" encoding="UTF-8"?>
<!-- Example of response to a query not matching any entry: https://dvbisr.private-service-list-registry.com/query?ProviderName=NotExistingProvider -->
<ServiceListRegistryEntity>
  <Name>A Private Service List Registry</Name>
  <ElectronicAddress>
    <mpeg7:Email>info@private-service-list-registry.com</mpeg7:Email>
    <mpeg7:Url>dvbisr.private-service-list-registry.com</mpeg7:Url>
  </ElectronicAddress>
</ServiceListRegistryEntity>
</ServiceListEntryPoints>
Annex D (normative):
Classification Schemes

D.1 HowRelatedCS

<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:dvb:metadata:cs:HowRelatedCS:2021" xmlns="urn:tva:mpeg7:2008"
tva_mpeg7.xsd" xsi:type="ClassificationSchemeType">
<!-- ##################################################################### -->
<!-- HOWRELATED                                                        -->
<!-- Definition: A series of definitions for possible relations between -->
<!-- services or programmes                                             -->
<!-- ##################################################################### -->
<Term termID="1000">
   <Name xml:lang="en">Service Related Material</Name>
   <Definition xml:lang="en">
      The reference points an item that can be used in the onscreen appearance of a service.
   </Definition>
</Term>
<Term termID="1000.1">
   <Name xml:lang="en">Out Of Service Banner</Name>
   <Definition xml:lang="en">
      A banner that can be shown when the service is selected outside of normal operating hours.
   </Definition>
</Term>
<Term termID="1000.2">
   <Name xml:lang="en">Content Finished Banner</Name>
   <Definition xml:lang="en">
      A banner that can be shown when all content in a finite duration content item has been played.
   </Definition>
</Term>
</Term>
<Term termID="1001">
   <Name xml:lang="en">Service Related Material</Name>
   <Definition xml:lang="en">
      The reference points an item that can be used in the onscreen appearance of a service.
   </Definition>
</Term>
<Term termID="1001.1">
   <Name xml:lang="en">Service List Logo</Name>
   <Definition xml:lang="en">
      A graphical icon that can be used to visually identify a service list.
   </Definition>
</Term>
<Term termID="1001.2">
   <Name xml:lang="en">Service Logo</Name>
   <Definition xml:lang="en">
      A graphical icon that can be used to visually identify a service.
   </Definition>
</Term>
<Term termID="1001.3">
   <!-- ... -->
</Term>
<Name xml:lang="en">Service Banner</Name>
<Definition xml:lang="en">
A large format graphical element that depicts a scene or theme for the service.
</Definition>
</Term>
</Term>
<Term termID="1002">
<Name xml:lang="en">Content Guide Material</Name>
<Definition xml:lang="en">
The reference points an item that can be used in the onscreen appearance of a content guide.
</Definition>
</Term>
<Term termID="1002.1">
<Name xml:lang="en">Content Guide Service Logo</Name>
<Definition xml:lang="en">
A graphical icon that can be used to visually identify a content guide service.
</Definition>
</Term>
</Term>
</ClassificationScheme>

D.2 LinkedApplicationCS

<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:dvb:metadata:cs:LinkedApplicationCS:2019"
xmns="urn:tva:mpeg7:2008" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:tva:mpeg7:2008 tva_mpeg7.xsd" xsi:type="ClassificationSchemeType">
<!-- ###################################################################### -->
<!-- LINKEDAPPLICATION                                                      -->
<!-- Definition: Application links and associated relationships with media -->
<!-- ###################################################################### -->
<Term termID="1">
<Name xml:lang="en">App for service when available</Name>
<Definition xml:lang="en">An associated application that is intended to be started during the availability period of a service instance</Definition>
<Term termID="1.1">
<Name xml:lang="en">App with media in parallel</Name>
<Definition xml:lang="en">An associated application to be started in parallel with commencing presentation of any A/V media</Definition>
</Term>
<Term termID="1.2">
<Name xml:lang="en">App controlling media presentation</Name>
<Definition xml:lang="en">An associated application that controls media presentation or has no media</Definition>
</Term>
</Term>
<Term termID="2">
<Name xml:lang="en">App for outside availability period</Name>
<Definition xml:lang="en">An associated application to be started outside the availability period of a service instance</Definition>
</Term>
<Term termID="3">
<Name xml:lang="en">A service provider's home page</Name>
<Definition xml:lang="en">
Run a service provider's home page as a linked application, e.g. from the DVB-I content guide or a UI giving a list of available services (perhaps
without guide data).
</Term>
</ClassificationScheme>

D.3 RecordingInfoCS

<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:dvb:metadata:cs:RecordingInfoCS:2019" xmlns="urn:tva:mpeg7:2008"
tva_mpeg7.xsd" xsi:type="ClassificationSchemeType">
<!-- RECORDINGINFO 
Definition: A series of definitions providing information about recording permission -->
<!-- ##################################################################### -->
<Term termID="1">
  <Name xml:lang="en">Broadcast simulcast</Name>
  <Definition xml:lang="en">
    A simulcast of a service or event delivered using DVB-C/S/T
  </Definition>
</Term>
<Term termID="2">
  <Name xml:lang="en">Provider-scheduled service</Name>
  <Definition xml:lang="en">
    A scheduled service other than a broadcast simulcast with scheduled times determined by the service provider
  </Definition>
</Term>
<Term termID="3">
  <Name xml:lang="en">Concurrent live</Name>
  <Definition xml:lang="en">
    A service other than a broadcast simulcast or provider-scheduled service carrying a concurrent transmission of a live event
  </Definition>
</Term>
<Term termID="4">
  <Name xml:lang="en">Other, recording permitted</Name>
  <Definition xml:lang="en">
    A service other than a broadcast simulcast, provider-scheduled service or concurrent live transmission for which the provider wishes to allow recording
  </Definition>
</Term>
<Term termID="5">
  <Name xml:lang="en">Other, recording not permitted</Name>
  <Definition xml:lang="en">
    A service other than a broadcast simulcast, provider-scheduled service or concurrent live transmission for which the provider does not grant permission for recording
  </Definition>
</Term>
</ClassificationScheme>

D.4 ServiceTypeCS

<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:dvb:metadata:cs:ServiceTypeCS:2019" xmlns="urn:tva:mpeg7:2008"
tva_mpeg7.xsd" xsi:type="ClassificationSchemeType">
<!-- ServiceType 
Definition: Definitions for the different types of service -->
<!-- ##################################################################### -->
Table D.1 provides an informational mapping on how the service_type defined in ETSI EN 300 468 [6] is mapped to elements in the Service List. Service types not listed have no mapping to DVB-I.

### Table D.1: Mapping of ETSI EN 300 468 [6] service_type to DVB-I

<table>
<thead>
<tr>
<th>ETSI EN 300 468 [6]</th>
<th>DVB-I service list</th>
</tr>
</thead>
<tbody>
<tr>
<td>service_type</td>
<td>Description</td>
</tr>
<tr>
<td>0x01</td>
<td>digital television service (see note 1)</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear&quot;</td>
</tr>
<tr>
<td>0x02</td>
<td>digital radio sound service (see note 2)</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear-radio&quot;</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceInstance.ContentAttributes.AudioAttributes.NumOfChannels = 1 or 2</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceInstance.ContentAttributes.VideoAttributes does not exist</td>
</tr>
<tr>
<td>0x04</td>
<td>NVOD reference service (see note 1)</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear&quot;</td>
</tr>
<tr>
<td></td>
<td>Service.NVOD@mode=&quot;reference&quot;</td>
</tr>
<tr>
<td>service_type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>0x05</td>
<td>NVOD time-shifted service (see note 1)</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear&quot;</td>
</tr>
<tr>
<td></td>
<td>Service.NVOD@mode=&quot;timeshifted&quot;</td>
</tr>
<tr>
<td>0x06</td>
<td>mosaic service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:mosaic&quot;</td>
</tr>
<tr>
<td></td>
<td>Relevant descriptive AudioAttributes and VideoAttributes</td>
</tr>
<tr>
<td>0x07</td>
<td>FM radio service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear-radio&quot;</td>
</tr>
<tr>
<td>0x0A</td>
<td>advanced codec digital radio sound service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear-radio&quot;</td>
</tr>
<tr>
<td>0x0B</td>
<td>H.264/AVC mosaic service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:mosaic&quot;</td>
</tr>
<tr>
<td>0x0C</td>
<td>data broadcast service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:data&quot;</td>
</tr>
<tr>
<td>0x11</td>
<td>MPEG-2 HD digital television service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear&quot;</td>
</tr>
<tr>
<td>0x16</td>
<td>H.264/AVC SD digital television service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear&quot;</td>
</tr>
<tr>
<td>0x17</td>
<td>H.264/AVC SD NVOD time-shifted service</td>
</tr>
<tr>
<td></td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear&quot;</td>
</tr>
<tr>
<td></td>
<td>Service.NVOD@mode=&quot;timeshifted&quot;</td>
</tr>
<tr>
<td>service_type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>0x18</td>
<td>H.264/AVC SD NVOD reference service</td>
</tr>
<tr>
<td>0x19</td>
<td>H.264/AVC HD digital television service</td>
</tr>
<tr>
<td>0x1A</td>
<td>H.264/AVC HD NVOD time-shifted service</td>
</tr>
<tr>
<td>0x1B</td>
<td>H.264/AVC HD NVOD reference service</td>
</tr>
<tr>
<td>0x1C</td>
<td>H.264/AVC frame compatible plano-stereoscopic HD digital television service (see note 3)</td>
</tr>
<tr>
<td>0x1D</td>
<td>H.264/AVC frame compatible plano-stereoscopic HD NVOD time-shifted service (see note 3)</td>
</tr>
<tr>
<td>0x1E</td>
<td>H.264/AVC frame compatible plano-stereoscopic HD NVOD reference service (see note 3)</td>
</tr>
</tbody>
</table>
### DVB-I service list

<table>
<thead>
<tr>
<th>service_type</th>
<th>Description</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x20</td>
<td>HEVC UHD digital television service with HDR and/or a frame rate of 100 Hz, 120 000/1 001 Hz, or 120 Hz, or any combination of HDR and these frame rates (see note 5)</td>
<td>Service.ServiceType=&quot;urn:dvb:metadata:cs:ServiceTypeCS:2019:linear&quot;&lt;br&gt;Service.ServiceInstance.ContentAttributes.VideoAttributes.PictureFormat=&quot;urn:tva:metadata:cs:PictureFormatCS:2015:1.3&quot; &lt;</td>
</tr>
</tbody>
</table>

**NOTE 1:** MPEG-2 SD material should use this type.<br>**NOTE 2:** MPEG-1 Layer 2 audio material should use this type.<br>**NOTE 3:** For information on the use of these values, see clause I.2.3 of ETSI EN 300 468 [6] and ETSI TS 101 547-2 [i.9].<br>**NOTE 4:** For rules on the use of this value, see clause I.2.5 of ETSI EN 300 468 [6] and ETSI TS 101 547-4 [i.10]. This value should be used for backward compatible HLG10 HDR services, and/or backward compatible high frame rate (HFR) services which are decodable by HEVC_UHDTV_IRD as defined in ETSI TS 101 154 [22], see clause I.2.5.2 of ETSI EN 300 468 [6].<br>**NOTE 5:** For rules on the use of these values, see clause I.2.6 of ETSI EN 300 468 [6].<br>**NOTE 6:** HEVC related terms are defined in urn:dvb:metadata:cs:VideoCodecCS:2020, urn:dvb:metadata:cs:VideoCodecCS:2021 or urn:dvb:metadata:cs:VideoCodecCS:2022.

### D.5 ContentSubject

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme xsi:type="ClassificationSchemeType"
<!-- ***********************************************************************
DVB Content Subject Classification Scheme.
Defined in ETSI EN 300 468 for the content descriptor.
Version ETSI EN 300 468 V1.16.1.
*********************************************************************** -->
    <Term termID="0"> Undefined content </Term>
    <Term termID="1"> Movie/Drama </Term>
    <Term termID="1.0"> Movie/Drama (general) </Term>
    <Term termID="1.1"> Detective/Thriller </Term>
    <Term termID="1.2"> Adventure/Western/War </Term>
</ClassificationScheme>
```
<Term termID="1.3">
  <Name xml:lang="en">Science fiction/Fantasy/Horror</Name>
</Term>

<Term termID="1.4">
  <Name xml:lang="en">Comedy</Name>
</Term>

<Term termID="1.5">
  <Name xml:lang="en">Soap/Melodrama/Folkloric</Name>
</Term>

<Term termID="1.6">
  <Name xml:lang="en">Romance</Name>
</Term>

<Term termID="1.7">
  <Name xml:lang="en">Serious/Classical/Religious/Historical movie/Drama</Name>
</Term>

<Term termID="1.8">
  <Name xml:lang="en">Adult movie/Drama</Name>
</Term>

<Term termID="2">
  <Name xml:lang="en">News/Current affairs</Name>
  <Term termID="2.0">
    <Name xml:lang="en">News/Current affairs (general)</Name>
  </Term>
  <Term termID="2.1">
    <Name xml:lang="en">News/Weather report</Name>
  </Term>
  <Term termID="2.2">
    <Name xml:lang="en">News magazine</Name>
  </Term>
  <Term termID="2.3">
    <Name xml:lang="en">Documentary</Name>
  </Term>
  <Term termID="2.4">
    <Name xml:lang="en">Discussion/Interview/Debate</Name>
  </Term>
</Term>

<Term termID="3">
  <Name xml:lang="en">Show/Game show</Name>
  <Term termID="3.0">
    <Name xml:lang="en">Show/Game show (general)</Name>
  </Term>
  <Term termID="3.1">
    <Name xml:lang="en">Game show/Quiz/Contest</Name>
  </Term>
  <Term termID="3.2">
    <Name xml:lang="en">Variety show</Name>
  </Term>
  <Term termID="3.3">
    <Name xml:lang="en">Talk show</Name>
  </Term>
</Term>

<Term termID="4">
  <Name xml:lang="en">Sports</Name>
</Term>
<Term termID="4.1">
  <Name xml:lang="en">Sports (general)</Name>
</Term>

<Term termID="4.2">
  <Name xml:lang="en">Special events (Olympic Games, World Cup, etc.)</Name>
</Term>

<Term termID="4.3">
  <Name xml:lang="en">Sports magazines</Name>
</Term>

<Term termID="4.4">
  <Name xml:lang="en">Football/Soccer</Name>
</Term>

<Term termID="4.5">
  <Name xml:lang="en">Tennis/Squash</Name>
</Term>

<Term termID="4.6">
  <Name xml:lang="en">Team sports (excluding football)</Name>
</Term>

<Term termID="4.7">
  <Name xml:lang="en">Athletics</Name>
</Term>

<Term termID="4.8">
  <Name xml:lang="en">Motor sport</Name>
</Term>

<Term termID="4.9">
  <Name xml:lang="en">Water sport</Name>
</Term>

<Term termID="4.10">
  <Name xml:lang="en">Winter sports</Name>
</Term>

<Term termID="4.11">
  <Name xml:lang="en">Equestrian</Name>
</Term>

<Term termID="5.0">
  <Name xml:lang="en">Children's/Youth programmes (general)</Name>
</Term>

<Term termID="5.1">
  <Name xml:lang="en">Pre-school children's programmes</Name>
</Term>

<Term termID="5.2">
  <Name xml:lang="en">Entertainment programmes for 6 to 14</Name>
</Term>

<Term termID="5.3">
  <Name xml:lang="en">Entertainment programmes for 10 to 16</Name>
</Term>

<Term termID="5.4">
  <Name xml:lang="en">Informational/Educational/School programmes</Name>
</Term>

<Term termID="5.5">
  <Name xml:lang="en">Cartoons/Puppets</Name>
</Term>
<Term termID="6">
  <Name xml:lang="en">Music/Ballet/Dance</Name>
  <Term termID="6.0">
    <Name xml:lang="en">Music/Ballet/Dance (general)</Name>
  </Term>
  <Term termID="6.1">
    <Name xml:lang="en">Rock/Pop</Name>
  </Term>
  <Term termID="6.2">
    <Name xml:lang="en">Serious music/Classical music</Name>
  </Term>
  <Term termID="6.3">
    <Name xml:lang="en">Folk/Traditional music</Name>
  </Term>
  <Term termID="6.4">
    <Name xml:lang="en">Jazz</Name>
  </Term>
  <Term termID="6.5">
    <Name xml:lang="en">Musical/Opera</Name>
  </Term>
  <Term termID="6.6">
    <Name xml:lang="en">Ballet</Name>
  </Term>
</Term>

<Term termID="7">
  <Name xml:lang="en">Arts/Culture (without music)</Name>
  <Term termID="7.0">
    <Name xml:lang="en">Arts/Culture (without music, general)</Name>
  </Term>
  <Term termID="7.1">
    <Name xml:lang="en">Performing arts</Name>
  </Term>
  <Term termID="7.2">
    <Name xml:lang="en">Fine arts</Name>
  </Term>
  <Term termID="7.3">
    <Name xml:lang="en">Religion</Name>
  </Term>
  <Term termID="7.4">
    <Name xml:lang="en">Popular culture/Traditional arts</Name>
  </Term>
  <Term termID="7.5">
    <Name xml:lang="en">Literature</Name>
  </Term>
  <Term termID="7.6">
    <Name xml:lang="en">Film/Cinema</Name>
  </Term>
  <Term termID="7.7">
    <Name xml:lang="en">Experimental film/Video</Name>
  </Term>
  <Term termID="7.8">
    <Name xml:lang="en">Broadcasting/Press</Name>
  </Term>
  <Term termID="7.9">
    <Name xml:lang="en">New media</Name>
  </Term>
</Term>
<Term termID="7.10">
  <Name xml:lang="en">Arts/Culture magazines</Name>
</Term>

<Term termID="7.11">
  <Name xml:lang="en">Fashion</Name>
</Term>

<Term termID="8">
  <Name xml:lang="en">Social/Political issues/Economics</Name>
  <Term termID="8.0">
    <Name xml:lang="en">Social/Political issues/Economics (general)</Name>
  </Term>
  <Term termID="8.1">
    <Name xml:lang="en">Magazines/Reports/Documentary</Name>
  </Term>
  <Term termID="8.2">
    <Name xml:lang="en">Economics/Social advisory</Name>
  </Term>
  <Term termID="8.3">
    <Name xml:lang="en">Remarkable people</Name>
  </Term>
</Term>

<Term termID="9">
  <Name xml:lang="en">Education/Science/Factual topics</Name>
  <Term termID="9.0">
    <Name xml:lang="en">Education/Science/Factual topics (general)</Name>
  </Term>
  <Term termID="9.1">
    <Name xml:lang="en">Nature/Animals/Environment</Name>
  </Term>
  <Term termID="9.2">
    <Name xml:lang="en">Technology/Natural sciences</Name>
  </Term>
  <Term termID="9.3">
    <Name xml:lang="en">Medicine/Physiology/Psychology</Name>
  </Term>
  <Term termID="9.4">
    <Name xml:lang="en">Foreign countries/Expeditions</Name>
  </Term>
  <Term termID="9.5">
    <Name xml:lang="en">Social/Spiritual sciences</Name>
  </Term>
  <Term termID="9.6">
    <Name xml:lang="en">Further education</Name>
  </Term>
  <Term termID="9.7">
    <Name xml:lang="en">Languages</Name>
  </Term>
</Term>

<Term termID="10">
  <Name xml:lang="en">Leisure hobbies</Name>
  <Term termID="10.0">
    <Name xml:lang="en">Leisure hobbies (general)</Name>
  </Term>
  <Term termID="10.1">
  
  </Term>
</Term>
<Name xml:lang="en">Tourism/Travel</Name>
</Term>
<Term termID="10.2">
  <Name xml:lang="en">Handicraft</Name>
</Term>
<Term termID="10.3">
  <Name xml:lang="en">Motoring</Name>
</Term>
<Term termID="10.4">
  <Name xml:lang="en">Fitness and health</Name>
</Term>
<Term termID="10.5">
  <Name xml:lang="en">Cooking</Name>
</Term>
<Term termID="10.6">
  <Name xml:lang="en">Advertisement/Shopping</Name>
</Term>
<Term termID="10.7">
  <Name xml:lang="en">Gardening</Name>
</Term>

<Term termID="11">
  <Name xml:lang="en">Special characteristics</Name>
  <Term termID="11.0">
    <Name xml:lang="en">Original language</Name>
  </Term>
  <Term termID="11.1">
    <Name xml:lang="en">Black and white</Name>
  </Term>
  <Term termID="11.2">
    <Name xml:lang="en">Unpublished</Name>
  </Term>
  <Term termID="11.3">
    <Name xml:lang="en">Live broadcast</Name>
  </Term>
  <Term termID="11.4">
    <Name xml:lang="en">Plano-stereoscopic</Name>
  </Term>
  <Term termID="11.5">
    <Name xml:lang="en">Local or regional</Name>
  </Term>
</Term>
<Term termID="12">
  <Name xml:lang="en">Adult</Name>
  <Term termID="12.0">
    <Name xml:lang="en">Adult (general)</Name>
  </Term>
</Term>
</ClassificationScheme>

D.6 ColorimetryCS

<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:dvb:metadata:cs:ColorimetryCS:2020" xmlns="urn:tva:mpeg7:2008"
tva_mpeg7.xsd" xsi:type="ClassificationSchemeType"?>
Colorimetry

Definition: Different picture colorimetry standards

---

<Term termID="1">
  <Name xml:lang="en">ITU BT.709</Name>
  <Definition xml:lang="en">ITU BT.709 colorimetry</Definition>
</Term>

<Term termID="2">
  <Name xml:lang="en">BT.2020</Name>
  <Definition xml:lang="en">ITU BT.2020 colorimetry</Definition>
  <Term termID="2.1">
    <Name xml:lang="en">BT.2020 NCL</Name>
    <Definition xml:lang="en">ITU BT.2020 non-constant luminance colorimetry</Definition>
  </Term>
</Term>

<Term termID="3">
  <Name xml:lang="en">BT.2100</Name>
  <Definition xml:lang="en">ITU BT.2100 colorimetry</Definition>
  <Term termID="3.1">
    <Name xml:lang="en">BT.2100 NCL</Name>
    <Definition xml:lang="en">ITU BT.2100 non-constant luminance colorimetry</Definition>
  </Term>
</Term>
Annex E (normative):
Implementation Considerations

E.1 Interface between DVB-I client and DVB-DASH player
Refer to clause 4.1 of DVB A184 [34].

E.2 Handling multiple service lists
Refer to clause 4.2 of DVB A184 [34].

Annex F (informative):
A typical service installation
Refer to clause 4.3 of DVB A184 [34].

Annex G (informative):
Signalling of services delivered with HLS

G.1 Introduction
A Service List as defined in this document includes several options for signalling additional formats for the delivery of media. Several approaches are possible to signal services which use HTTP Live Streaming (HLS) according to IETF RFC 8216 [i.13]. The service instance for the HLS service can

- be signalled as an application controlling media presentation according to clause 5.2.3.2 (see clause G.2.1), or
- include an OtherDeliveryParameters element with values indicating and referencing the HLS playlist for use by a native player function (see clause G.2.2), or
- use the IdentifierBasedDeliveryParameters element to convey the location of the HLS playlist and datatype (see clause G.2.3).

In addition, a replay of the scheduled program may be available on demand or as part of a box set.

Alternatively DASH and HLS delivered media can co-exist to some extent as described in clause G.4.

G.2 Service Instance

G.2.1 Use of Linked Applications
To support DVB-I clients where a built-in HLS player is not available, a player application for controlling media presentation can be signalled according to clause 5.2.3.2. The player application can be specific to the service, or can be a generic application.
G.2.2 Use of OtherDeliveryParameters

The extension name of “vnd.apple.mpegurl” indicates that the delivery parameters identify an HLS playlist which is further confirmed by the MIME type of “application/vnd.apple.mpegurl” as specified in IETF RFC 8216 [i.13]. The specified URI can be passed to a suitable player, if supported. Any related application to be used in parallel to the playback can also be signalled to provide additional interactivity.

An example definition of the extension conveying the URL of the HLS playlist, as seen in the example in clause G.5, would be:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<schema xmlns="http://www.w3.org/2001/XMLSchema"
    targetNamespace="vnd:apple:mpegurl"
    xmlns:dvbi-types="urn:dvb:metadata:servicediscovery-types:2023"
    elementFormDefault="qualified" attributeFormDefault="unqualified">
    <import namespace="urn:dvb:metadata:servicediscovery-types:2023"
        schemaLocation="dvbi_types_v1.0.xsd"/>
    <complexType name="m3u8RefType">
        <complexContent>
            <extension base="dvbi-types:ExtensionBaseType">
                <sequence>
                    <element name="UriBasedLocation" type="dvbi-types:ExtendedURIType"/>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
</schema>
```

G.2.3 Use of IdentifierBasedDeliveryParameters

The IdentifierBasedDeliveryParameters element with a service instance can be used to convey delivery system information which can be expressed as a URI. The URL to an HLS playlist adheres to this notion.

G.3 On Demand Programmes

When HLS is used to replay a scheduled program, either through on demand or box set selection, a deep-linked XML AIT is used to invoke the application for playback. That application would determine whether a suitable player is available or whether the application itself will function in a similar manner to an application controlling media playback according to clause 5.2.3.2.

G.4 Common Media Segments

If neither built-in support for HLS nor linked applications supporting MSE are available then an alternative for service and content providers is to encode the media segments once for both DASH and HLS but to provide separate DASH and HLS manifests. Section 4 of CTA-5005 [i.14] describes, for various use-cases, constraints on authoring DASH content for HLS compatibility and vice-versa, constraints on authoring HLS content for DASH compatibility. If the content was originally authored for DASH then an HLS m3u8 playlist would also need to be produced referencing that content. If the content was originally authored for HLS then a DASH MPD would also need to be produced.
G.5 Examples

The following example illustrates a service instance signalling a player application.

```
<ServiceInstance>
  <DisplayName xml:lang="en">XBC-1 HLS player app</DisplayName>
  <RelatedMaterial>
    <!-- service instance logo -->
    <MediaLocator>
      <tva:MediaUri contentType="image/png">
        http://xbc.tv/dvb-i-apps/xbc-1.png
      </tva:MediaUri>
    </MediaLocator>
    </RelatedMaterial>
  </ServiceInstance>

The following example illustrates a service instance signalling an HLS playlist using a third party concrete type instantiated against the OtherDeliveryParameters element.

```
<ServiceList ... xmlns="urn:dvb:metadata:servicediscovery:2023" xmlns:hls="vnd:apple:mpegurl"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="vnd:apple:mpegurl hls-url.xsd">
  <ServiceInstance>
    <DisplayName xml:lang="en">XBC-1 in HLS</DisplayName>
    <RelatedMaterial>
      <!-- service instance logo -->
      <MediaLocator>
        <tva:MediaUri contentType="image/png">
          http://xbc.tv/dvb-i/xbc-1-hls.png
        </tva:MediaUri>
      </MediaLocator>
    </RelatedMaterial>
    </ServiceInstance>
  </ServiceList>

The following example illustrates a service instance signalling an HLS playlist using the IdentifierBasedDeliveryParameters element in a service instance.

```
<ServiceInstance>
  <OtherDeliveryParameters extensionName="vnd.apple.mpegurl"
    xsi:type="hls:m3u8RefType">
    <hls:UriBasedLocation contentType="application/vnd.apple.mpegurl">
      <URI>http://xbc.tv/hls_content/ch1/xbc-1.m3u8</URI>
    </hls:UriBasedLocation>
  </OtherDeliveryParameters>
</ServiceInstance>
```
<ServiceList ... xmlns="urn:dvb:metadata:servicediscovery:2023" xmlns:hls="vnd:apple:mpegurl"
   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
   xsi:schemaLocation="vnd:apple:mpegurl hls-url.xsd">
    <ServiceInstance>
        <DisplayName xml:lang="en">XBC-1 in HLS</DisplayName>
        <RelatedMaterial />
        <MediaLocator>
            <tva:MediaUri contentType="image/png">
                http://xbc.tv/dvb-i/xbc-1-hls.png
            </tva:MediaUri>
        </MediaLocator>
        <IdentifierBasedDeliveryParameters contentType="application/vnd.apple.mpegurl">
            http://xbc.tv/hls_content/ch1/xbc-1.m3u8?auth=foo
        </IdentifierBasedDeliveryParameters>
    </ServiceInstance>
</ServiceList>

Other service and service instance related elements, such as ContentProtection, ContentAttributes and SubscriptionPackage are equally applicable for the selection and use of the service instance.

---

**Annex H (normative): List of Uniform Resource Names (URN)**

Annex A of CTA-5000 [41] and Table H.1 provide URNs that can be used for signalling the necessary compliance to a web standard for rendering an application. Typical usage for these URNs is the signalling of required terminal capabilities to deliver access services via a linked application as described in clause 4.5.3.

**Table H.1 URN for required standard version to run a linked application**

<table>
<thead>
<tr>
<th>URN</th>
<th>Reference</th>
<th>Description</th>
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<tbody>
<tr>
<td>urn:hbbtv.appinformation:standardversion:hbbtv:1.2.1</td>
<td>ETSI TS 102 796 [2116] v1.2.1</td>
<td>HbbTV 1.5</td>
</tr>
<tr>
<td>urn:hbbtv.appinformation:standardversion:hbbtv:1.5.1</td>
<td>ETSI TS 102 796 [21] v1.5.1</td>
<td>HbbTV 2.0.2</td>
</tr>
<tr>
<td>urn:hbbtv.appinformation:standardversion:hbbtv:1.6.1</td>
<td>ETSI TS 102 796 [21] v1.6.1</td>
<td>HbbTV 2.0.3</td>
</tr>
<tr>
<td>urn:hbbtv.appinformation:standardversion:hbbtv:1.7.1</td>
<td>ETSI TS 102 796 [21] v1.7.1</td>
<td>HbbTV 2.0.4</td>
</tr>
</tbody>
</table>
Table H.2 lists URNs for signalling the usage of optional terminal capabilities to deliver access services via a linked application as described in clause 4.5.3.

### Table H.2 URN for required optional feature to run a linked application

<table>
<thead>
<tr>
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History

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