



**Hybrid Radio**  
**XML Specification for Electronic Programme Guide (EPG)**



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**Reference**

RTS/JTC-DAB-xx

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**Keywords**audio, broadcasting, DAB, digital, DRM, EPG,  
hybrid, RadioDNS**ETSI**

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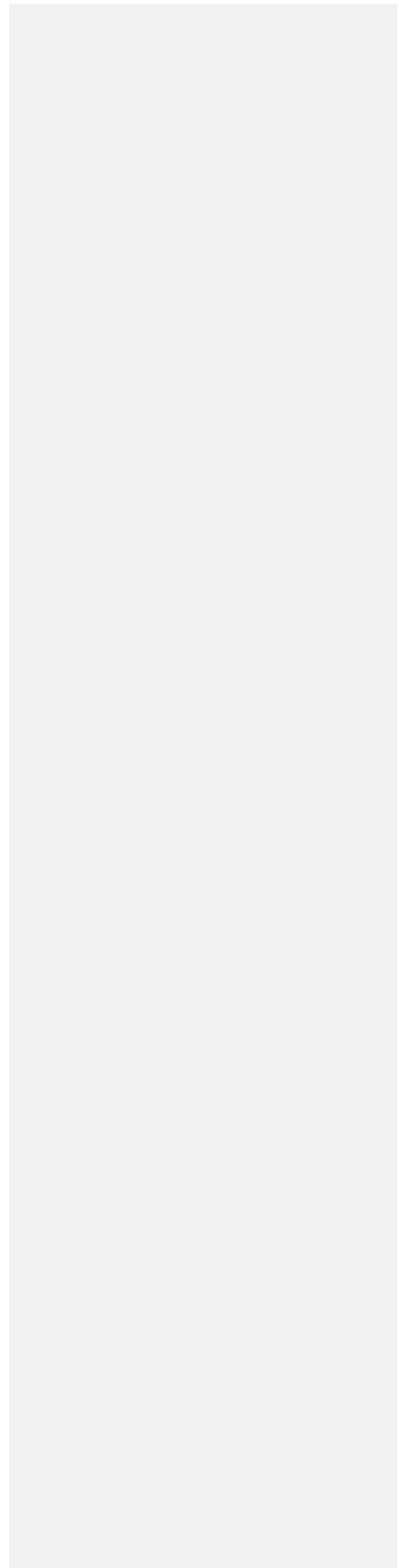
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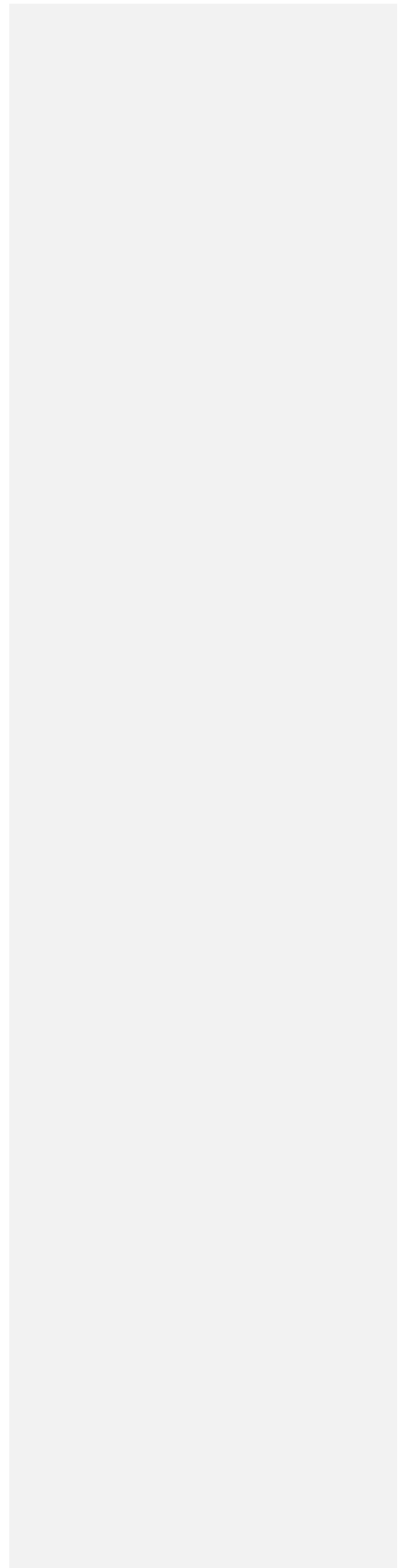
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## Foreword

This Technical Specification (TS) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECTrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE 1: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva.

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The Eureka Project 147 was established in 1987, with funding from the European Commission, to develop a system for the broadcasting of audio and data to fixed, portable or mobile receivers. Their work resulted in the publication of European Standard, EN 300 401 [XXX], for DAB (see note 2) which now has worldwide acceptance.

NOTE 2: DAB is a registered trademark owned by one of the Eureka Project 147 partners.

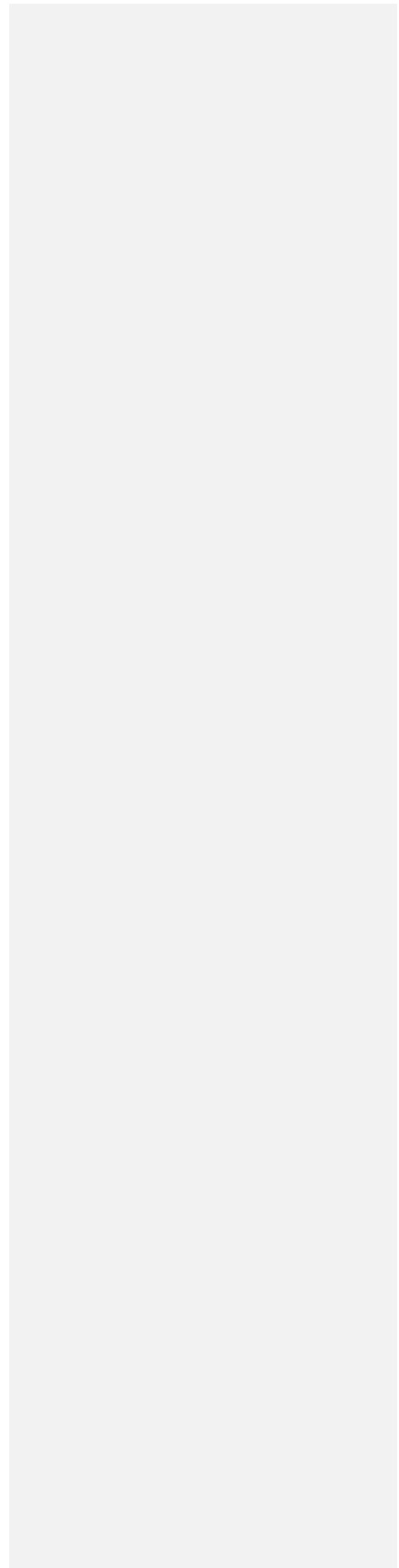
The DAB family of standards is supported by World DMB, an organization with members drawn from broadcasting organizations and telecommunication providers together with companies from the professional and consumer electronics industry.

[XXX]

Ben Poor 27/11/13 12:56

**Comment [1]:** Presumably at this point, a short paragraph on RadioDNS and its trademarks, etc. is necessary





---

# 1 Scope

The present document defines the XML schema data model for an Electronic Programme Guide (EPG).

It is envisaged that this data format could be used both for transmitting schedule data to EPG applications on receivers and as the basis for exchanging information between broadcasters, network operators and content providers.

## 2 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 reference document (including any amendments) applies.

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

### 2.1 Normative references

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

- [1] ETSI TS 102 822-4: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 4: Phase 1 - Content referencing".
- [2] ISO 8601: "Data elements and interchange formats - Information interchange - Representation of dates and times".
- [3] IETF RFC 3986: "Uniform Resource Identifiers (URI): Generic Syntax".
- [4] WAP Forum: "Wireless Application Protocol; Wireless Markup Language Specification".
- [5] W3C Recommendation 4 February 2004: "Extensible Markup Language (XML) 1.0 (Third Edition)".
- [6] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".
- [7] IETF RFC 3066: "Tags for the Identification of Languages".
- [8] PNG Development Group: "Portable Network Graphics (PNG) Specification, Version 1.1".
- [9] IETF RFC 3966: "The tel URI for Telephone Numbers".
- [10] IETF RFC 3191: "Minimal GSTN address format in Internet Mail".
- [11] IETF RFC 6068: "The 'mailto' URI scheme".
- [12] Void.
- [13] Void.
- [14] IETF RFC 2046: "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types".
- [15] IETF RFC 4289: "Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures".
- [16] ISO/IEC 11172-3: "Information technology -- Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s -- Part 3: Audio".
- [17] ISO/IEC 13818-3: "Information technology -- Generic coding of moving pictures and associated audio information -- Part 3: Audio".
- [18] ETSI EN 300 401: "Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers".
- [19] ISO/IEC 10646: "Information technology - Universal Multiple-Octet Coded Character Set (UCS)".
- [20] ISO 8859-2: "Information technology -- 8-bit single-byte coded graphic character sets -- Part 2: Latin alphabet No. 2".

- [21] ETSI TS 102 822-3-1: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 - Metadata schemas".
- [22] ETSI TS 102 371: "Digital Audio Broadcasting (DAB); Digital Radio Mondiale (DRM); Transportation and Binary Encoding Specification for Electronic Programme Guide (EPG)".
- [23] ETSI ES 201 980: "Digital Radio Mondiale (DRM); System specification".
- [24] ETSI TS 102 563: "Digital Audio Broadcasting (DAB); Transport of Advanced Audio Coding (AAC) audio".

Ben Poor 6/1/14 17:03

**Comment [2]:** Review all references

## 2.2 Informative references

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.

Not applicable.

## 3 Definitions and abbreviations

### 3.1 Definitions

**service** A radio station.

**service provider** The organisation responsible for the service(s).

### 3.2 Abbreviations

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

AAC	Advanced Audio Coding
CDATA	Character DATA
CRID	Content Reference ID
CS	Classification Schemes
EPG	Electronic Programme Guide
GI	Group Information
HTTP	Hyper Text Transfer Protocol
IANA	Internet Assigned Numbers Authority
IP	Internet Protocol
ISO	International Organization for Standardization
JTC	Joint Technical Committee
MIME	Multipurpose Internet Mail Extensions
MPEG	Moving Picture Experts Group
PI	Programme Information
PNG	Portable Network Graphics
PPI	Pixels Per Inch
SI	Service Information
SMS	Short Messaging Service
URI	Uniform Resource Identifier
URL	Uniform Resource Location
UTC	Co-ordinated Universal Time
UTF	Unicode Transform Format
XML	eXtensible Markup Language

Ben Poor 6/1/14 17:03

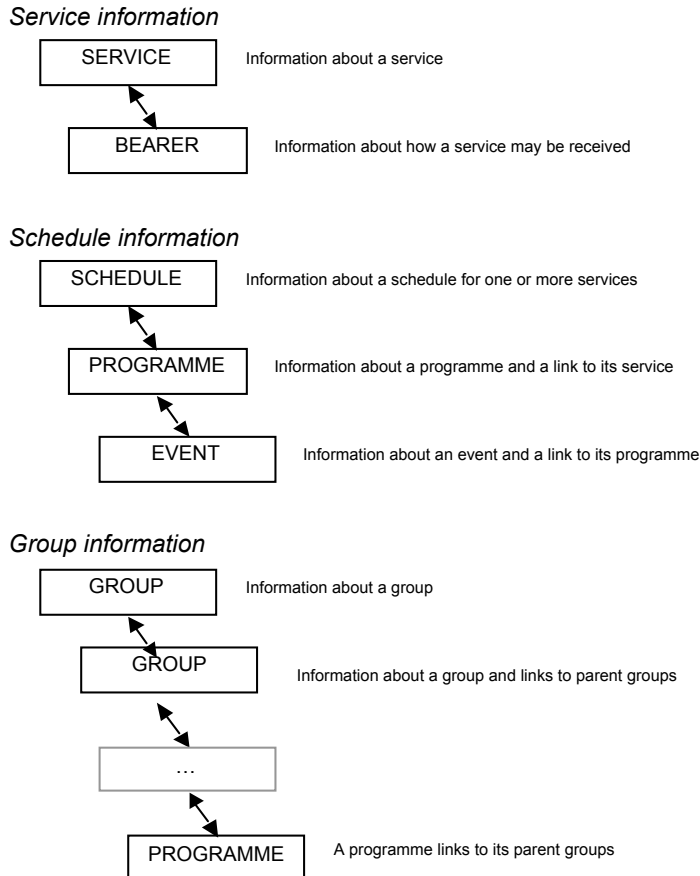
**Comment [3]:** Review all abbreviations

## 4 Introduction

It is intended that broadcasters will use the EPG to provide service information and programme listings information for both audio and data services, and that device manufacturers will use the EPG as a mechanism for the user to select services, programmes and related content.

A key requirement is that the EPG shall work on a range of receivers with differing display capabilities, resources and back-channel capabilities. To achieve this, a flexible structure has been defined, as shown in figure 1.

The EPG data is broken down into service information (services) and programme information (schedules, programmes, groups and events). Additionally programmes and events can be linked together into groups (e.g. for grouping programmes together into serials or series).



**Figure 1**

The EPG may be delivered using HTTP or transmitted via broadcasting systems. The philosophy is that the broadcasting system will deliver the elements within documents specific to that broadcasting system, the DAB or DRM broadcasting systems.

For example, DAB will carry a DAB EPG describing DAB ensembles and services and DRM will carry a DRM EPG describing DRM services.

## 4.1 Document structure

The EPG specification is split into 3 documents:

- Service Information (SI) file.
- Programme Information (PI) file.
- Group Information (GI) file.

The present document shows some short examples of each document, followed by definitions of common elements and data types. Additional sections then detail the elements and attributes for each document type.

## 4.2 Document Contents

### 4.2.1 Character encoding

The ISO/IEC 10646 [XXX] character set using UTF-8 character encoding shall be used in all EPG XML documents where applicable.

NOTE: The ISO/IEC 10646 [XXX] character set contains all characters of the DAB character sets (three EBU Latin-based sets, ISO 8859-2 [XXX] and ISO/IEC 10646 [XXX] using UTF-8).

## 4.3 Examples

To give an idea of what can be done with this XML definition some simple and complex examples are shown in clauses 4.3.1 to 4.3.3.

### 4.3.1 Service Information

Service information includes the structure of and information about services and their associated bearers, as well as any brand groups the services may be part of.

```
<?xml version="1.0" encoding="UTF-8"?>
<serviceInformation xmlns="http://www.worlddab.org/schemas/epg"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.worlddab.org/schemas/epg
  http://www.worlddab.org/schemas/epg/epg_16.xsd"
  creationTime="2013-04-25T00:05:31+01:00" originator="Global Radio"
  xml:lang="en">
  <services>
    <serviceProvider>
      <shortName>Global</shortName>
      <mediumName>Global Radio</mediumName>
      <multimedia url="http://epg.musicradio.com/logos/global/320x240.png" mime="image/png"
        height="240" width="320" />
      <multimedia url="http://epg.musicradio.com/logos/global/32x32.png" mime="image/png"
        height="32" width="32" />
      <keywords>radio, television, publishing, talent, charities & communities
      </keywords>
      <link uri="http://www.thisisglobal.com" mime="text/html" description="Homepage" />
      <link uri="postal:Global%20Radio/30%20Leicester%20Square/London/WC2H%207LA" />
      <link uri="tel:+44-020-77666000" />
      <location>
        <country>GB</country>
        <point>51.473939 -2.508112</point>
      </location>
    </serviceProvider>
    <service>
      <bearer id="dab:gb.c185.c479.0" mime="audio/mpeg"
        offset="2000" cost="20" />
      <bearer id="fm:gb.c479.09580" cost="30" />
      <bearer id="http://media-ice.musicradio.com/Capital"
        offset="4000" mime="audio/aacp" bitrate="48" cost="40" />
      <bearer id="http://media-ice.musicradio.com/CapitalMP3Low"
        offset="4000" mime="audio/mpeg" bitrate="48" cost="40" />
      <shortName>Capital</shortName>
      <mediumName>Capital FM</mediumName>
      <longName>Capital London</longName>
      <shortDescription>
```

Ben Poor 27/11/13 13:26

**Comment [4]:** Moved Service Information to the first example due to its primacy.

```

    The UK's No.1 Hit Music Station
  </shortDescription>
  <multimedia url="http://owdo.thisisglobal.com/2.0/id/25/logo/32x32.png"
    height="32" width="32" />
  <multimedia url="http://owdo.thisisglobal.com/2.0/id/25/logo/112x32.png"
    height="32" width="112" />
  <multimedia url="http://owdo.thisisglobal.com/2.0/id/25/logo/128x128.jpg"
    height="128" width="128" />
  <multimedia url="http://owdo.thisisglobal.com/2.0/id/25/logo/320x240.jpg"
    height="240" width="320" />
  <multimedia url="http://owdo.thisisglobal.com/2.0/id/25/logo/640x480.jpg"
    height="480" width="640" />
  <multimedia url="http://owdo.thisisglobal.com/2.0/id/25/logo/800x800.jpg"
    height="800" width="800" />
  <genre href="urn:tva:metadata:cs:ContentCS:2004:3.6.10">
    Hit-Chart/Song Requests
  </genre>
  <genre href="urn:tva:metadata:cs:ContentCS:2004:3.6.8">
    Electronic/Club/Urban/Dance
  </genre>
  <genre href="urn:tva:metadata:cs:ContentCS:2004:3.1.1.11">
    Local/Regional
  </genre>
  <genre href="urn:tva:metadata:cs:ContentCS:2004:3.6.8.14">
    Dance/Dance-pop
  </genre>
  <genre href="urn:tva:metadata:cs:ContentCS:2004:3.1.4.12">
    Showbiz
  </genre>
  <keywords>London, music, pop, rock, dance, urban</keywords>
  <link description="Text the Studio" uri="sms:83958" />
  <link uri="http://www.capitalfm.com/london" mime="text/html" />
  <location>
    <country>GB</country>
    <polygon>
      51.524124 -2.709503 51.572803 -2.668304 51.616310 -2.572174
      51.575363 -2.412872 51.504471 -2.379913 51.426613 -2.471924
      51.400063 -2.460937 51.387211 -2.511749 51.328896 -2.708130
      51.273087 -2.772675 51.238705 -2.938843 51.258476 -3.036346
      51.376068 -3.026733 51.472401 -2.859879 51.524124 -2.709503
    </polygon>
  </location>
  <radiodns fqdn="www.capitalfm.com" serviceIdentifier="london" />
  <serviceGroupMember id="capital" />
</service>
</services>
<serviceGroups>
  <serviceGroup id="capital">
    <shortName>Capital</shortName>
    <mediumName>Capital FM</mediumName>
    <shortDescription>The UK's No.1 Hit Music Station</shortDescription>
    <link description="Capital on Wikipedia" mime="text/html"
      uri="http://en.wikipedia.org/wiki/Capital_(radio_network)" />
    <multimedia url="http://owdo.thisisglobal.com/2.0/id/153/logo/32x32.png"
      height="32" width="32" />
    <multimedia url="http://owdo.thisisglobal.com/2.0/id/153/logo/112x32.png"
      height="32" width="112" />
    <multimedia url="http://owdo.thisisglobal.com/2.0/id/153/logo/128x128.jpg"
      height="128" width="128" />
    <multimedia url="http://owdo.thisisglobal.com/2.0/id/153/logo/320x240.jpg"
      height="240" width="320" />
    <multimedia url="http://owdo.thisisglobal.com/2.0/id/153/logo/640x480.jpg"
      height="480" width="640" />
  </serviceGroup>
</serviceGroups>
</serviceInformation>

```

### 4.3.2 Schedules

Schedule information describes a programme schedule for a single service over a defined time interval, typically around a 24-hour period from midnight to midnight. Individual programmes may also include programme events, signifying events within the programme.

```

<?xml version="1.0" encoding="UTF-8"?>
<epg xmlns="http://www.worlddab.org/schemas/epg/16 "
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

```



```

    xsi:schemaLocation="http://www.worlddab.org/schemas/epg/16
http://www.worlddab.org/schemas/epg/16/epg_16.xsd"
xml:lang="en"
  creationTime="2013-04-11T01:20:00+01:00" originator="Global Radio">
  <scope startTime="2013-04-25T06:00:00+01:00" stopTime="2013-04-25T13:00:00+01:00"/>
  <programme id="crid://www.capitalfm.com/4772/1190223">
    <shortName>B'fast</shortName>
    <mediumName>Breakfast</mediumName>
    <longName>Capital Breakfast</longName>
    <schedule>
      <time time="2013-04-25T06:00:00+01:00" duration="PT4H"
        actualTime="2013-04-25T06:00:00+01:00" actualDuration="PT4H"/>
    </schedule>
    <shortDescription>Forget the coffee, Capital gives you the perfect morning pick-me-up with a
blend of the latest hits, travel news and incomparable morning banter.</shortDescription>
    <genre href="urn:tva:metadata:cs:ContentCS:2002:3.6.8">
      <![CDATA[ Electronic/Club/Urban/Dance]]>
    </genre>
    <genre href="urn:tva:metadata:cs:IntentionCS:2002:1.1">
      <![CDATA[ ENTERTAINMENT]]>
    </genre>
    <memberOf id="crid://www.capitalfm.com/4772"/>
    <link url="mailto:capital.breakfast@capitalfm.com" description="Email the Capital Breakfast
team!" />
    <link url="http://www.capitalfm.com/on-air/breakfast-show/" />
    <programmeEvent id="crid://thisisglobal.com/4772/1190223/788946">
      <shortName>Pun</shortName>
      <mediumName>No.1 Pun</mediumName>
      <longName>London's No. 1 Pun</longName>
      <schedule>
        <relativeTime time="PT3H10M" duration="PT25M"/>
      </schedule>
      <shortDescription>
        Can you come up with London's No.1 Pun for our story of the day?
      </shortDescription>
    </programmeEvent>
  </programme>
</epg>

```

### 4.3.3 Groups

Group information allows programmes and programme events to be put into groups. These may be series, serials or just general themes. A hierarchical approach also allows groups to belong to other groups.

```

<?xml version="1.0" encoding="UTF-8"?>
<programmeGroups xmlns="http://www.worlddab.org/schemas/epg/16"
  xmlns:epg="http://www.worlddab.org/schemas/epg/16"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.worlddab.org/schemas/epg/16
http://www.worlddab.org/schemas/epg/16/epg_16.xsd"
  xml:lang="en"
  creationTime="2013-04-25T14:21:15+01:00" originator="Global Radio">
  <programmeGroup id="crid://www.classicfm.com/shows/tour" type="show" numofItems="24">
    <mediumName>Musical Tour</mediumName>
    <longName>Classic's Magical Musical Tour</longName>
    <shortDescription>Every Saturday night, join us on a Magical Musical Tour of all things classical
music.</shortDescription>
    <genre href="urn:tva:metadata:cs:ContentCS:2009:3.6.1">
      <![CDATA[ Classical music]]>
    </genre>
    <genre href="urn:tva:metadata:cs:FormatCS:2002:2.5">
      <![CDATA[ ARTISTIC PERFORMANCE]]>
    </genre>
    <genre href="urn:tva:metadata:cs:IntentionCS:2005:1.1">
      <![CDATA[ ENTERTAINMENT]]>
    </genre>
    <memberOf id="crid://www.classicfm.com/shows/weekend"/>
  </programmeGroup>
</programmeGroups>

```

## 5 Common data types

This clause describes common data types that are used throughout this specification.

### 5.1 CRID

A unique identifier for a programme, programme event or programme group in the format of a Content Reference ID (CRID) as defined in the TV-Anytime specification [XXX].

This should be in the following form:

```
crid://<authority>/<data>
```

Where *<authority>* is a registered Internet domain name that the CRID author has permission to use. The *<authority>* string is case insensitive. *<data>* is a free format string (URI compliant and case insensitive) that is meaningful to the given authority and should uniquely identify the content within that authority.

For example:

```
crid://www.capitalfm.com/4472/1148985
crid://www.heart.co.uk/breakfast
```

### 5.2 MIME

This indicates the MIME type (RFC 2045 [XXX]) of contained data or links and shall be used where it is applicable. The registered list of MIME types is available from the IANA list of Mime Types (RFC 2046 [XXX] and RFC 4289 [XXX]). However, an application is permitted to use values not in this list as long as they conform to the requirements set out in RFC 2046 [XXX].

For example:

```
audio/mpeg
text/html
application/x-myapplication
```

### 5.3 genre

This indicates the genre of a programme, programme event, group or service (audio or data). The genre scheme is based on that used by TV-Anytime [XXX]. The supported classification schemes are:

- IntentionCS.
- FormatCS.
- ContentCS.
- OriginationCS.
- IntendedAudienceCS.
- ContentAlertCS.
- MediaTypeCS.
- AtmosphereCS.

The text content of the element, if used, should contain the name of the genre. This is purely intended to make the element more readable for humans.

Its attributes are detailed below:

Attribute	Description	Type	Status
-----------	-------------	------	--------

ETSI

Ben Poor 9/12/13 14:27

**Comment [5]:** Flattened this section somewhat.

Removed all inline XSD declarations in favour of a clearer explanation.

**broadcastType** is now obsolete, as we are spanning both broadcast and non-broadcast

**contentIDType** is now obsolete, as we are now using Bearer URIs

**durationType** is now obsolete, in favour of using the standard **xs:duration** type. We will need some examples, and an explanation that this must be a non-negative period. Note this de-restricts the field, which was primarily done for the purposes of binary DAB EPG. A warning will have to be used to indicate that this restriction may still exist in the binary DAB EPG specification.

**recommendationType** is now obsolete.

**serviceProviderType** is now a more complex type

**shortCRIDType** is more specific to DAB EPG binary and should be moved there, to be generated either separately or as a function of the main CRID. Any restrictions must be carried over for compatibility with existing receivers.

**systemType** is now obsolete, but may be used in the DAB EPG binary translation.

**timePointType** is now obsolete, in favour of using the standard **xs:dateTime** type. We will need some examples, and an explanation that a missing timezone means UTC, rather than Local Time. Or, mandate that a timezone must always be used.

**triggerType** is now obsolete.

**urlType** is now most definitely obsolete, in favour of the standard **xs:anyURI** type. Will need to ensure that the references to the more interesting URIs still exist (mail, sms, etc.).

**CAType** is now obsolete, having only two non-useful values and never having been implemented.

**epgLanguageType** is now obsolete, being quite vague as to what it means. Any functionality can be used by the root `xml:lang` attribute.

**genreType** should be modified slightly to remove the **preferred** attribute from the name element. It has no definition in the existing text, and since the name element is descriptive only, can have no purpose.

**alternateSourceType** is now obsolete, being DAB specific

**simulcastType** is now obsolete, being DAB specific.

**version** is not obsolete, wherever it appears, being DAB specific, the same functionality can be achieved in better ways (ie. Tld in MOT to d... [1])

Ben Poor 5/12/13 16:35

**Comment [6]:** Deprecating **description** subelement as no example shows this in usage, and its not useful beyond readability, which can be done just as easily using the **name**.

href	<b>Genre URN</b> Indicates the genre, the Classification Scheme (CS) and the genre scheme used.	<i>xs:anyURI</i>	Required
------	--	------------------	----------

Ben Poor 19/12/13 09:38

**Comment [7]:** This **should** be compatible with the Genre URN value, but need to check that

For example:

```
<genre href="urn:tva:metadata:cs:ContentCS:2002:3.6.9">
  <![CDATA[World/Traditional/Ethnic/Folk music]]>
</genre>
```

Ben Poor 5/12/13 16:51

**Comment [8]:** Moved the name from its own element to the text content of the main element, now that we have gotten rid of other subelements.

## 5.4 keywords

This contains a comma-separated case-insensitive list of keywords. The language attribute indicates the language of the keyword list and is in the form of an `xml:lang` attribute [XXX] and RFC 3066 [XXX]. The keywords shall be separated by commas. The comma-separated list may have leading and trailing spaces, but these are not considered to contain information.

Zero or more of these elements may exist under a **programme**, **programmeEvent**, **programmeGroup** or **service** element, in any valid language.

Its attributes are detailed below:

Attribute	Description	Type	Status
xml:lang	<b>Language</b> Defines the language of the keywords.	<i>xml:lang</i>	Optional, defaults to the default language of the document.

For example:

```
<keywords xml:lang="en">music, dance, hip-hop, jazz, soul</keywords>
```

## 5.5 link

This is used to link from a programme, programme event, programme group or service to an additional resource. This may be additional content, data, or interaction related to the parent element.

Its attributes are detailed below:

Attribute	Description	Type	Status
<u>uri</u>	<b>Destination URI</b> Initial creation datetime of this document	<i>xs:anyURI</i>	Required
mimeValue	<b>Destination MIME Type</b> Indicates the MIME type (RFC 2045 [6]) of any data linked to, if applicable.	<i>Valid MIMEtype</i>	Optional
expiryTime	<b>Link Expiry</b> This indicates the datetime at which the link is deemed to have expired. It should not be treated as valid beyond this time and should not be used or surfaced.  If this attribute is not specified, then no expiry is defined on the link. However, should the containing document be updated and the link not be included, this should be interpreted as it having expired.	<i>timepointType</i>	Optional

Ben Poor 19/12/13 09:43

**Comment [9]:** Changed from `url` to `uri`, as the definition has now been changed to accept any URI, as well as for consistency with RadioEPG.

Ben Poor 5/12/13 16:01

**Comment [10]:** Trying to firm up the expiry behaviour a bit more. Two ways to expire: 1) timepoint reached or exceeded, 2) link no longer in an updated document.

description	<p><b>Description</b> A short description of what the link describes, up to a maximum of 180 characters. Note that this should purely for descriptive purposes, or for possible display as a short description.</p> <p>It should not be used to infer machine-readable context on the link contents.</p>	<i>xs:string</i>	Optional
-------------	--	------------------	----------

Ben Poor 19/12/13 09:43

**Comment [11]:** Description has been clarified so as not to infer machine-readable context. Any context should be gleaned from the guidance in the later annex, imported from RadioEPG.

For example:

```
<link description="Classic FM website" mimeType="text/html" uri="http://www.classicfm.com/" />
<link description="Text the Studio" uri="sms:61812"/>
<link description="Track Listing"
  uri="http://www.classicfm.com/radio/playlist/2013/november/27/full-works-concert"
  mimeType="text/html"
  expiryTime="2013-12-04T00:00:00Z" />
```

Guidance on the usage and determining of link context can be found in Section XXX.

Ben Poor 5/12/13 16:20

**Comment [12]:** Link through to guidance annex on link usage.

## 5.6 names

This is a group of elements for adding names to programmes, programme events, programme groups and services. Three variants are supported: **shortName**, **mediumName** and **longName**, with the following character limits:

Element	Character Limit
shortName	8
mediumName	16
longName	128

Each element has the attribute detailed below:

Attribute	Description	Type	Status
xml:lang	<b>Language</b> Defines the language of the name.	<i>xml:lang</i>	Optional, defaults to the default language of the document.

Each may be specified more than once, with the same or other languages. For example:

Names for **programme**, **programmeEvent** and **programmeGroup** elements must include at least one **mediumName** element.

Names for the **service** element must include at least one **shortName** and **mediumName**.

## 5.7 descriptions

This is a group of elements for adding textual descriptions to programmes, programme events, programme groups and services. Two variants are supported: **shortDescription** and **longDescription**, with the following character limits:

Element	Character Limit
shortDescription	180
longDescription	1200

Each element has the attribute detailed below:

Attribute	Description	Type	Status
-----------	-------------	------	--------

xml:lang	<b>Language</b> Defines the language of the contained text.	xml:lang	Optional, defaults to the default language of the document.
----------	--	----------	---

Each may be specified zero or more times, with the same or other languages. For example:

[XXX]

## 5.8 multimedia

This element describes multimedia content related to the parent **programme**, **programmeEvent**, **programmeGroup** or **service** element. This may be video, audio or image content, such as a service or programme logo, or programme event audio clip.

Its attributes are detailed below:

Attribute	Description	Type	Status
xml:lang	<b>Multimedia Language</b> Defines the language of the multimedia content.	xml:lang	Optional, defaults to the default language of the document.
url	<b>Multimedia URL</b> URL of the multimedia content	URL	Required
mime	<b>MIME Type</b> The MIME Type [XXX] of the multimedia content	MIME type	Required
width	<b>Image Width</b> Width, in pixels, of image multimedia content.	Positive integer	Required if the content is an image
height	<b>Image Height</b> Height, in pixels, of image multimedia content.	Positive integer	Required if the content is an image

Ben Poor 9/12/13 21:31

**Comment [13]:** Add examples of different languages, different lengths in the same language.

Ben Poor 11/12/13 11:35

**Comment [14]:** Reworked the **mediaDescription** element as it was unnecessarily verbose. Moving the descriptionGroup group out to be on a par with the nameGroup (shortName, mediumName). Any logo images will now be within the **multimedia** image, again moved from the **mediaDescription** element out to under services, groups and programmes.

Ben Poor 9/12/13 17:05

**Comment [15]:** changed from **mimeValue** to **mime**, to remain consistent with the rest of the document

## 5.9 memberOf

This element can be contained within **programme**, **programmeEvent** or **programmeGroup** elements to indicate which group the parent element belongs to. Note that the grouping is implicit from multiple elements sharing the same group identifier. Additional information on the group itself may be specified within a Group Information (GI) file.

Its attributes are detailed below:

Attribute	Description	Type	Status
id	<b>Group CRID</b> Is the unique identifier for this group, as a Content Reference ID (CRID). The same identifier shall be used by all members of the group within this attribute.	CRID	Required
index	<b>Item Index</b> This is the index for the item within the specified group. This may be used, for example, to specify an episode number for a programme in a series.	Positive integer	Optional

Ben Poor 19/12/13 10:19

**Comment [16]:** Deprecating the shortId attribute, as this is DAB-specific and may be derived from the full CRID.

For example:

```
<memberOf id="crid://www.capitalfm.com/4772" index="206"/>
```

## 5.10 bearer

Describes a specific bearer upon which the service or programme is carried. Its attributes are detailed below:

Attribute	Description	Type	Status
id	<b>Bearer URI</b> A URI of the bearer details.  This is platform specific and detailed in Section XXX.	<i>URI</i>	Required
cost	<b>Bearer Cost</b> An indication of a relative 'cost' of acquiring the service from the service provider. This may be used by a device as a means of selecting an appropriate bearer to use.  This is further detailed in Section XXX.	<i>Positive integer</i>	Required
mime	<b>MIME Type</b> The MIME Type [XXX] of the audio carried by the bearer.	<i>MIME</i>	Dependant on the bearer
bitrate	<b>Audio Bitrate</b> Bitrate of the audio carried by the bearer, in kilobits per second (kbps).	<i>Positive integer</i>	Dependant on the bearer
offset	<b>Audio Offset</b> An indication of the offset given to the audio on this bearer by the service provider, in milliseconds relative to other bearers in the same document.	<i>Positive integer</i>	Optional, defaults to zero

It is strongly recommend that all available bearers are listed, in order to assist Service Following, as discussed further in Section 10. Broadcast/IP Service Following

A specific bearer type may have additional requirements, as listed in the following subsections.

### 5.10.1 VHF/FM

No additional requirements

### 5.10.2 DAB/DAB+ Digital Radio

The `mime` attribute is required for this bearer, and shall be defined as `audio/mpeg` for DAB and `audio/aacp` for DAB+ services.

### 5.10.3 Digital Radio Mondiale (DRM)

The `mime` attribute is required for DRM, and shall be defined as the MIME type of the encoded audio stream.

### 5.10.4 AM Signalling System (AMSS)

No additional requirements.

### 5.10.5 iBiquity Digital Corporation's HD Radio™ (HD Radio™)

No additional requirements.

### 5.10.6 IP-based

The `mime` attribute is required and shall be the MIME type of the audio codec carried.

The `bitrate` attribute is recommended and should indicate the bitrate in kilobits per second (kbps) of the audio stream.

## 5.11 location

This may be used to indicate geographical applicability, using zero or more of the following child elements in any combination.

Element	Description
country	<b>Country Code</b> Specifies location by country, using ISO 3166-1 alpha-2 country codes [XXX].
point	<b>Point</b> Based on the georss:point type [10], this specifies a point by latitude and longitude, in the format:  <latitude> <longitude>
polygon	<b>Polygon</b> Based on the georss:polygon [10] type, this specifies a space-separated series of points by latitude and longitude, forming an enclosed area, in the format:  <[<latitude> <longitude>]...>

Each may be interpreted in a different way based on its parent element and no particular meaning is mandated. The following paragraphs are given as suggestions:

A *country code* for a **serviceProvider**, **service**, **group** or **serviceID** may indicate the country or countries in which the provider, service, grouping or bearer is available, accessible, or located.

A *point* for a **serviceProvider** or **service** may indicate the exact coordinates of where the provider or service is based or located. For a **group** this may be set of points indicating the locations of the services within the network the group represents, or a single point showing the network centre. For a **serviceID**, it may represent the coordinates of the transmitter it represent, for broadcast bearers.

A *polygon* for a **service** or **group** may indicate the editorial or 'brand' area for that service or group. For a **serviceID** it may indicate the effective transmission area for broadcast bearers – to be used by as additional information for clients wishing to perform service following between the different bearers of a service.

### 5.11.1 Examples

Against a **serviceProvider** element, showing the location of the provider of the service:

```
<location>
  <country>GB</country>
  <point>51.473939 -2.508112</point>
</location>
```

Against a **service** element, showing its 'brand' area as a polygon:

```
<location>
  <polygon>
    51.524124 -2.709503 51.572803 -2.668304 51.616310 -2.572174
    51.575363 -2.412872 51.504471 -2.379913 51.426613 -2.471924
```

Ben Poor 9/12/13 12:29

**Comment [18]:** Changed from HTTP-based to IP-based as this could be HTTP or non-HTTP.

```

51.400063 -2.460937 51.387211 -2.511749 51.328896 -2.708130
51.273087 -2.772675 51.238705 -2.938843 51.258476 -3.036346
51.376068 -3.026733 51.472401 -2.859879 51.524124 -2.709503
</polygon>
</location>

```

## 5.11.2 Cross Referencing

The **location**, **country**, **point** and **polygon** elements may have the optional attribute **xml:id**, which has special meaning within the XML specification [11] as a way of uniquely indexing and cross-referencing elements.

If an element has been given this attribute, other instances of the same element at any point in the document may inherit its definition by using the **ref** attribute, with the value exactly matching the value defined in its **xml:id** attribute.

The following restrictions apply:

- An element containing a cross-reference to another shall not define any child elements or content.
- If an element makes a non-existent reference, then the entire element shall be ignored.
- An element shall only make a cross-reference to another element of the same type within the same document.

This may be used to define a point, country/countries, polygon or an entire location only once within a document, and make cross-references where applicable. For example, when indicating multiple FM broadcast bearers with the same transmission area:

```

<serviceID cost="30" id="fm:ce1.c36b.09630">
  <location xml:id="bristol-fm">
    <polygon>
      51.574081 -2.660065 51.551460 -2.545395 51.555302 -2.408752
      51.533096 -2.376480 51.480099 -2.400513 51.394920 -2.489090
      51.393208 -2.592087 51.417194 -2.664185 51.489937 -2.736969
      51.574081 -2.660065
    </polygon>
  </location>
</serviceID>

```

...

```

<serviceID cost="30" id="fm:gb.c46b.09630">
  <location ref="bristol-fm"/>
</serviceID>

```

Both describe the same transmitter with an equal transmission area, for a scenario where the PI code is switched around commercial breaks. To avoid duplication, the first occurrence of the location element is marked with an identifier using the **xml:id** attribute, and subsequent occurrences may cross-reference to this by using the **ref** attribute.



## 6 Service Information

The Service Information (SI) document holds a definition of services provided by the service provider, including any relevant metadata and bearer details, such as:

- Names (in different lengths and languages)
- Descriptions (in different lengths and languages)
- Logos (in different sizes, and formats)
- Genres
- Keywords
- Bearers the service can be received over (both broadcast and IP)

### 6.1 Contents

The following subsections detail the elements and values that may be used within the SI document.

#### 6.1.1 serviceInformation

This is the root element of the Service Information (SI) document and can contain zero or one of the following elements:

- `services`
- `groups`

Its attributes are detailed below:

Attribute	Description	Type	Status
creationTime	<b>Document creation datetime</b> Initial creation datetime of this document	<i>ISO8601 Datetime</i>	Optional
originator	<b>Originator</b> Describes the originator of the parent document, up to a maximum of 180 characters.	<i>String</i>	Optional
terms	<b>Terms and Conditions</b> Defines the URL of a plain text file containing metadata usage Terms and Conditions.  If defined, this applies to all documents for all services defined within the SI document.	<i>URL</i>	Optional
xml:lang	<b>Document Language</b> Defines the default language within the document. Any elements not explicitly indicated with a different language should be assumed to use this.	<i>xml:lang</i>	Optional, defaults to <b>en</b>

## 6.1.2 services

Can contain zero or one `serviceProvider` element and zero or more `service` elements

### 6.1.3 service

Describes metadata and available bearers for a service.

Can contain the following elements:

- `radiodns`
- `location`
- `bearer`
- `memberOf`
- Service Name Group (`shortName`, `mediumName`, `longName`)
- Description Group (`shortDescription`, `longDescription`)
- `multimedia`
- `genre`
- `keywords`
- `link`

At least one of each of the following descriptive elements shall be specified for each service, in the default document language:

- `shortName`
- `mediumName`
- `shortDescription`

Additional names may be used, in the default document or other language.

At least one `genre` element shall be given.

Additionally, each service shall include `multimedia` elements describing valid HTTP URLs of colour logos in either JPG or PNG formats, for the following sizes (width x height in pixels):

- 32x32
- 112x32
- 128x128
- 320x240
- 600x600

It is recommended that additional, larger logos also be included.

### 6.1.4 radiodns

This element details the RadioDNS lookup parameters for the service, and can be used in the discovery of additional RadioDNS applications as per the RadioDNS specification [2], Section 6.

Its attributes are detailed below:

Parameters	Description	Value	Status
<code>fqdn</code>	<b>RadioDNS Authoritative FQDN</b> The Authoritative FQDN used in the	<i>Valid internet domain</i>	Required

Ben Poor 9/12/13 12:29

**Comment [19]:** Now using the consistent `bearer` element, rather than `serviceID`.

Ben Poor 24/12/13 11:18

**Comment [20]:** Might be worth detailing the classification schema that is required - ideally we'd have at least one ContentCS genre. Worth detailing what the requirements are.

	discovery of RadioDNS applications as an alternative to using Broadcast Parameters.		
serviceIdentifier	<p><b>RadioDNS Service Identifier</b> The Service Identifier used in the discovery of RadioDNS applications as an alternative to using Broadcast Parameters.</p> <p>Note that this must be unique across all the services using the same Authoritative FQDN, as per the RadioDNS specification.</p>	Maximum 16 lower case characters in the range [a-z0-9]	Required

### 6.1.5 memberOf

This can be used to group services together for the purposes of similar service selection or presentation to a user. A service may be a member of zero or more groups, using zero or more `memberOf` elements.

The group the service belongs to is indicated with the `id` attribute in the following manner:

Parameters	Description	Value	Status
<code>id</code>	<p><b>Group Identifier</b> An identifying string for the group.</p>	<i>string</i>	Required

Other members of the group should share this identifier to be placed in the same group, and the group should be defined with the exact identifying string as stated against the group definition within the relevant `group` element (see Section XXX).

### 6.1.6 groups

Contains zero or more `group` elements.

### 6.1.7 group

This can be used to hold the details of a group, which can be used to group services together for the purposes of similar service selection or presentation to a user. The group identifier is contained within the `id` attribute in the following manner:

Parameters	Description	Value	Status
<code>id</code>	<p><b>Group Identifier</b> An identifying string for the group.</p>	<i>string</i>	<i>Required</i>

Each group can also contain the following descriptive elements, in order to add additional information about the group:

- Service Name Group (`shortName`, `mediumName`, `longName`)
- Description Group (`shortDescription`, `longDescription`)
- `multimedia`
- `genre`
- `keywords`
- `link`

These are all specific to the group they are contained within.

A service determined to be a member of the group should use this group identifier in its `memberOf` element (see XXX).

### 6.1.8 serviceProvider

Contains information on the provider of the services detailed within the SI document. Zero or one of this element may exist under the `services` element.

Can contain the following elements:

- `location`
- Service Name Group (`shortName`, `mediumName`, `longName`)
- Description Group (`shortDescription`, `longDescription`)
- `multimedia`
- `link`
- `keywords`

## 7 Schedules

### 7.1 Contents

#### 7.1.1 epg

This is the root element of the Programme Information (PI) document.

Can contain the following elements:

- `scope`
- `programme`

The **scope** element shall only be specified once per PI document.

Zero or more **programme** elements may be specified over non-overlapping time intervals. Time gaps between programmes are allowed.

Its attributes are detailed below:

Attribute	Description	Type	Status
<code>creationTime</code>	<b>Document creation datetime</b> Initial creation datetime of this document	<i>timePointType</i>	Optional
<code>originator</code>	<b>Originator</b> Describes the originator of the parent document, up to a maximum of 180 characters.	<i>xs:string</i>	Optional
<code>xml:lang</code>	<b>Document Language</b> Defines the default language within the document. Any elements not explicitly indicated with a different language should be assumed to use this.	<i>xml:lang</i>	Optional, defaults to <b>en</b>

Ben Poor 28/11/13 14:53

**Comment [21]:** Set the default language here to be English, to be consistent with other elements within the original DAB EPG XML spec.

Ben Poor 9/12/13 11:46

**Comment [22]:** Removing the bearer information from the scope element as this was a duplication, and could cause confusion. This can still be sent for the convenience of DAB devices within the DAB binary translation layer

Also remove version, for the same reasons as above definition

Ben Poor 28/11/13 15:33

**Comment [23]:** Just wanted to put a note in there to clarify. Needs more thought, as it does change the behaviour from the DAB EPG specification. However, the original functionality can be restored in the DAB EPG binary translation layer.

#### 7.1.2 `scope`

Indicates the total interval the document covers. Note that this may extend beyond the bounds of a single day. Any gaps between the entire span of all programmes in the schedule, and the time covered by an indicated scope should be interpreted as there being no available live programme content for that service during those times.

Its attributes are detailed below:

Attribute	Description	Type	Status
<code>startTime</code>	<b>Scope interval start</b> The start time of the interval over which the schedule applies. Note that this may be equal to or before the start time of the first programme.	<i>timePointType</i>	Required
<code>stopTime</code>	<b>Scope interval end</b> The end time of the interval over which the schedule applies. Note that this may be equal to or after the end time of the last programme.	<i>timePointType</i>	Required

#### 7.1.3 `programme`

Contains information specific to an individual programme, including its descriptive elements, timings, and any bearer information that differs from the service the PI document belongs to.

Can contain the following elements:

- `schedule`

Ben Poor 24/12/13 11:21

**Comment [24]:** Remove CA Type from definition.

Remove version, recommendation, broadcast and bitrate as these are DAB specific.

Removed simulcastType

- memberOf
- Schedule Name Group (shortName, mediumName, longName)
- Description Group (shortDescription, longDescription)
- multimedia
- genre
- keywords
- link
- programmeEvent

At least one of each of the following descriptive elements **MUST** be specified for each service, in the default document language:

- mediumName
- shortDescription

Its attributes are detailed below:

Attribute	Description	Type	Status
Id	<b>Content Reference ID (CRID)</b> Unique identifier for the programme (see XXX).	<i>CRIDType</i>	Required
xml:lang	<b>Programme Language</b> Defines the language of the content within the programme. This should be used if the language is different from that declared on the parent service.	<i>xml:lang</i>	Optional, defaults to <b>en</b>

Ben Poor 6/1/14 15:55

**Comment [25]:** Review the language inheritance – either this comes from the parent service, or the document language. The programme may be across several services, with their own language.

#### 7.1.4 programmeEvent

This element describes an event within a programme and can be used to break a programme into sections or to highlight particular sections of the programme.

Can contain the following elements:

- schedule
- memberOf
- Schedule Name Group (shortName, mediumName, longName)
- Description Group (shortDescription, longDescription)
- multimedia
- genre
- keywords
- link
- programmeEvent

At least one of each of the following descriptive elements **MUST** be specified for each service, in the default document language:

- mediumName
- shortDescription

Its attributes are detailed below:

Attribute	Description	Type	Status
-----------	-------------	------	--------

id	<b>Content Reference ID (CRID)</b> Unique identifier for the programme event (see XXX).	<i>CRIDType</i>	Required
xml:lang	<b>Programme Language</b> Defines the language of the content within the programme event. This should be used if the language is different from that declared on the parent programme.	<i>xml:lang</i>	Optional, defaults to <b>en</b>

## 7.1.5 schedule

This element specifies the scheduled times and bearers that a programme and programme event may appear, and may appear one or more times within a **programme** or **programmeEvent** element.

### 7.1.5.1 Scheduled Programme

When used within a **programme** element, this can contain the following elements:

- time
- **bearer**

The **time** element describes an absolute time point and has the following attributes:

Attribute	Description	Type	Status
time	<b>Billed Start Time</b> Billed start time of the programme. This should be the start time as advertised.	<i>xs:datetime</i>	Required
duration	<b>Billed Duration</b> Billed duration of the programme. This should be the duration as advertised.	<i>xs:duration</i>	Required
actualTime	<b>Actual Start Time</b> May be defined if the actual start time of the programme differs from the billed time (e.g. if the actual start of the programme is after a 3 minute news bulletin).	<i>xs:datetime</i>	Optional
actualDuration	<b>Actual Duration</b> May be defined if the actual duration of the programme differs from the billed duration.	<i>xs:duration</i>	Optional

Ben Poor 9/12/13 12:23

**Comment [26]:** Now referring to a common **bearer** element, which also takes in the additional RadioEPG bearer information (offset, cost, mimetype, bitrate)

Several examples are shown below:

1) A single **programme** element billed to start at 11:00 with a duration of 3 hours, using the bearers of the parent service:

```
<schedule>
  <time time="2013-04-25T11:00:00+01:00" duration="PT3H"/>
</schedule>
```

2) A single **programme** element billed to start at 14:00 with a duration of 1 hour, but actually starting after a 3 minute new bulletin, using the bearer information of the parent service:

```
<schedule>
  <time time="2013-04-25T14:00:00+01:00" duration="PT1H"
    actualTime="2013-04-25T14:03:00+01:00" actualDuration="PT57M" />
</schedule>
```

3) A **programme** element scheduled at a single time across 3 bearers, overriding the bearers of the parent service.

```
<schedule>
  <time time="2013-12-05T12:00:00Z" duration="PT3H"/>
  <bearer cost="20" id="dab:gb.c185.c479.0" mime="audio/mpeg" offset="2000" />
  <bearer cost="30" id="fm:gb.c479.09580" />
  <bearer bitrate="48" cost="70" id="http://media-ice.musicradio.com/Capital" mime="audio/aacp" />
</schedule>
```

4) A **programme** element scheduled to repeat at multiple times within the scope of the document, using the bearers of the parent service.

```
<schedule>
  <time time="2013-12-05T09:30:00Z" duration="PT30M"/>
  <time time="2013-12-05T11:30:00Z" duration="PT5M"/>
  <time time="2013-12-05T15:30:00Z" duration="PT5M"/>
</schedule>
```

5) A **programme** element scheduled to repeat at multiple times within the scope of the document, on a mix of bearers. The programme is simulcasted at 11:00 and 16:00 on both FM and DAB bearers, and then repeated 21:00 on FM and 22:00 on DAB.

```
<schedule>
  <time time="2013-12-05T11:00:00Z" duration="PT1H"/>
  <time time="2013-12-05T16:00:00Z" duration="PT1H"/>
  <bearer cost="30" id="fm:gb.c479.09580" />
  <bearer cost="20" id="dab:gb.c185.c479.0" mime="audio/mpeg" offset="2000" />
</schedule>
<schedule>
  <time time="2013-12-05T21:00:00Z" duration="PT1H"/>
  <bearer cost="30" id="fm:gb.c479.09580" />
</schedule>
```

Multiple times should only be used if the programme is identical between repeats, and the times all appear within the scope of the document. For example, the next programme in a series should have a separate programme entry, and the programmes linked together into the same Group using the **memberOf** element (see XXX).

### 7.1.5.2 Scheduled Programme Event

When used within a **programmeEvent** element, this can contain the following elements:

- `relativeTime`
- `bearer`

The **relativeTime** element describes a relative time point from the start of the programme the event appears within and has the following attributes:

Attribute	Description	Type	Status
time	<b>Billed Start Time Offset</b> Billed start time offset of the programme event from the start of the programme.	<i>xs:duration</i>	Required
duration	<b>Billed Duration</b> Billed duration of the programme event. This should be the duration as advertised.	<i>xs:duration</i>	Required
actualTime	<b>Actual Start Time Offset</b> May be defined if the actual start time offset of the programme event differs from the billed time offset.	<i>xs:duration</i>	Optional
actualDuration	<b>Actual Duration</b> May be defined if the actual duration of the programme event differs from the billed duration.	<i>xs:duration</i>	Optional



## 8 Groups

### 8.1 Contents

#### 8.1.1 programmeGroups

This is the root element of the Group Information (GI) document.

Can contain zero or more `programmeGroup` elements.

Its attributes are detailed below:

Attribute	Description	Type	Status
<code>creationTime</code>	<b>Document creation datetime</b> Initial creation datetime of the parent document	<i>xs:datetime</i>	Optional
<code>originator</code>	<b>Originator</b> Describes the originator of the parent document, up to a maximum of 180 characters.	<i>xs:string</i>	Optional
<code>xml:lang</code>	<b>Document Language</b> Defines the default language within the document. Any elements not explicitly indicated with a different language should be assumed to use this.	<i>xml:lang</i>	Optional, defaults to <b>en</b>

Ben Poor 28/11/13 14:53

**Comment [27]:** Set the default language here to be English, to be consistent with other elements within the original DAB EPG XML spec.

#### 8.1.2 programmeGroup

This is used to add additional information on a grouping of programmes, programme events or other groups. A group is uniquely identified with its CRID, and this adds descriptive information, a defined type and total number of grouped items.

Grouped programmes and programme events will declare their a grouping within their own PI document.

Can contain the following elements:

- `memberOf`
- Schedule Name Group (`shortName`, `mediumName`, `longName`)
- Description Group (`shortDescription`, `longDescription`)
- `multimedia`
- `genre`
- `keywords`
- `link`
- `memberOf`

At least one of each of the following descriptive elements shall be specified for each service, in the default document language:

- `mediumName`
- `shortDescription`

Its attributes are detailed below:

Attribute	Description	Type	Status
<code>id</code>	<b>Content Reference ID (CRID)</b> Unique identifier for the group (see XXX).	<i>CRID</i>	Required
<code>type</code>	<b>Group Type</b>	<i>programmeGroup type</i>	Required

	Defines the type of the group, as given in XXX.		
numOfItems	<b>Number of Grouped Items</b> The total number of grouped items, across all documents that this group is used within.	<i>Positive integer</i>	Required

### 8.1.3 programmeGroup types

This is an enumeration used to indicate the type of grouping.

Value	Description
<b>series</b>	an ordered or unordered collection of programmes that is shown in a sequence (e.g. "The News Quiz" season 1).
<b>show</b>	a programme theme that is typically associated with a collection of series (e.g. all episodes of "The News Quiz").
<b>programConcept</b>	the editorial concept for a programme from which specific programme versions have been derived (e.g. the concept of "Blood Runner" as opposed to "Blood Runner - The Director's Cut" as a specific version of that concept).
<b>magazine</b>	a collection of individual programmes that are shown as a group because they are editorially coherent (e.g. a general sports programme with individual sub-programmes covering different events).
<b>topic</b>	a collection of programmes on a particular topic or theme.
<b>programCompilation</b>	a collection of programmes that is used to allow segments from multiple programmes to be combined in segment groups.
<b>otherCollection</b>	can be used for any group not defined in the preceding list where all members of the group should be acquired if the group is selected. For example, a group of channel highlights or recommendations.
<b>otherChoice</b>	can be used for any group not defined in the list above where only one member of the group should be acquired if the group is selected.

## 9. Acquiring Documents using HTTP

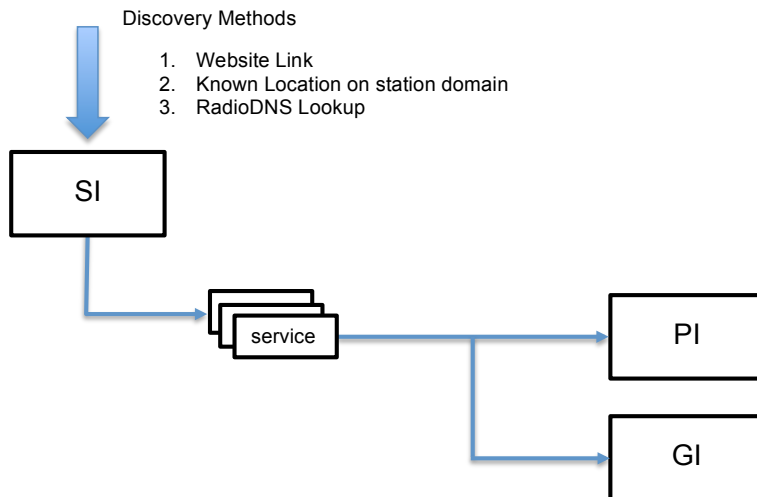
All documents in this specification may be transmitted or made available to devices in a number of ways, including HTTP and broadcast technologies such as DAB/DRM.

This section details methods through which the documents may be made available over HTTP.

### 9.1 Location Discovery

When discovering EPG documents for a particular service, the device shall first acquire the Service Information (SI) document containing the metadata for that service. This can be done by one of three discovery methods:

1. Website Link
2. Known Location on station domain
3. RadioDNS Lookup



Note that for documents acquired over HTTP a broadcaster may make all services available in a single SI document, or spread them across multiple documents – one for each service, brand, or regional grouping. This arrangement is a choice for the broadcaster – a device will still properly locate all documents for a service if it goes through the following discovery methods.

#### 9.1.1 Service Information

##### 9.1.1.1 Website Link

The URL of the SI document is contained within the (X)HTML header section <link> tag of any HTML pages on a station's website. The link should have the following attributes:

Attribute	Description
rel	<b>Link Type</b> Shall be set to the value: <code>radioepg</code>
href	<b>Link Target</b> Gives the URL of the SI document

For example, for a station with its website homepage at `http://www.capitalfm.com/london`, its HTML header section may contain:

```
<head>
  <link rel="radioepg"
        href="http://epg.musicradio.com/radiodns/epg/SI.xml">
</head>
```

Ben Poor 12/12/13 13:49

**Comment [28]:** I guess this could point anywhere really, including the RadioEPG URL.

### 9.1.1.2 Known Location on station domain

The URL to obtain the SI document is constructed as follows:

```
http://<host>:<port>/radiodns/epg/SI.xml
```

Where `host` and `port` are the host and port of the station website.

For example, for a service with a website on port 80 and its website at the domain `www.capitalfm.com`, the URL will be:

```
http://www.capitalfm.com/radiodns/epg/SI.xml
```

### 9.1.1.3 RadioDNS Lookup

RadioDNS [XXX] enables devices to locate additional data for audio services, either using Broadcast Parameters for DAB/DAB+, DRM/AMSS and HD Radio or In-Stream Parameters for IP streams.

A device must be capable of resolving the RadioDNS Authoritative FQDN for a service via the methodology defined in the RadioDNS specification [2].

Lookup may then be performed against this FQDN by means of a DNS SRV Record request for the RadioEPG application by using the SRV Record Service Name: `radioepg`

If at least one SRV record is successfully resolved, this service supports document lookup using RadioDNS, accessed on the host and port indicated in the relevant SRV record. For example, for a query made to:

```
_radioepg._tcp.rdns.musicradio.com
```

Using the `nslookup` tool, this would yield the following SRV record:

```
service = 0 100 80 www.capitalfm.com.
```

This indicates that document lookup can be performed using the host `epg.musicradio.com`, port 80.

Note that more than one SRV record may be returned with different values. This can be used for loadbalancing purposes by providing different Hosts/Ports with different priorities/weightings. See the SRV record specification [XXX] for a more detailed explanation on handling SRV resolution results.

The URL to obtain the SI document is then constructed as follows:

```
http://<host>:<port>/radiodns/epg/XSI.xml
```

For the above example, this would result in a URL of:

```
http://www.capitalfm.com/radiodns/epg/SI.xml
```

## 9.1.2 Programme Information

The location of Programme Information (PI) documents for a service may be found by performing a RadioDNS lookup, given one of the following:

- Broadcast Parameters of an audio service,

Ben Poor 12/12/13 14:43

**Comment [29]:** We could potentially expand this to include a situation where it is NOT necessary to perform a further RadioDNS lookup – for instance, by using a previously acquired Path and then appending a path onto that for the PI file.

However, it may be more straightforward to just give the option of just using RadioDNS lookup.

- RadioDNS Lookup Parameters given In-Stream for an IP-delivered audio service, or discovered from the SI document for that service.

In either case, a RadioDNS Lookup must be performed to locate the RadioEPG application **host** and **port**. These are then used to construct the PI file URL for a particular day, in the following format:

```
http://<host>:<port>/radiodns/epg/<broadcast parameters>/<date>_PI.xml
```

Where **host** and **port** are populated by the host and port values obtained from the SRV record lookup for the RadioEPG application.

PI documents are stored as a file per day's schedule contained within. The **date** value represents the day you wish to obtain the schedule for. It is populated in the format **YYYYMMDD**, for example Thursday, 25<sup>th</sup> April, 2013 would be represented as 20130425.

Note that the service may be located in a different timezone than the device requesting the PI file and, as such, the current date may not be the same for both. Because of this, a device should examine the returned PI file and determine whether the programmes contained within cover the desired time period. If not, additional requests for dates either before or after should be performed, depending on the requirements. The device may use an indication of the service location (e.g. by using the service **location** element, if defined, or by derivation from any indicated broadcast parameters) to better predict the difference in timezones and speed up this process.

The broadcast parameters are based on the bearer of the service being consumed and specified in the following subsections, specific to each bearer.

### 9.1.2.1 VHF/FM

The broadcast parameters value for a VHF/FM service PI request URI is constructed as follows:

```
fm/(<gcc>|<country>)/<pi>/<frequency>
```

The parameters are populated with the following values:

Parameters	Description	Value	Status
country	<b>ISO 3166 two-letter country code</b> The ISO 3166-1 alpha-2 2-letter country code [XXX] of the territory of broadcast for the service.	2-char string	
pi	<b>Programme Identification (PI)</b> Service broadcast RDS PI code.	4-char hexadecimal	mandatory
frequency	<b>Frequency</b> Frequency on which the service broadcast is received, formatted to 5 characters in units of 100KHz. Frequencies below 100Mhz must be supplied with a leading zero, for example 95.8MHz would be represented as 09580, 104.9MHz as 10490.	5-char string	mandatory

For a detailed explanation on these parameters and their values, please refer to the VHF/FM section of RDNS01 [XXX].

### 9.1.2.2 DAB/DAB+ Digital Radio

The broadcast parameters value for a DAB/DAB+ Digital Radio service PI request URI is constructed as follows:

```
dab/<country>/<eid>/<sid>/<scids>/[(<appty-uate>|<pa>)]
```

The parameters are populated with the following values:

Parameters	Description	Value	Status
country	<b>ISO 3166 two-letter country code</b> The ISO 3166-1 alpha-2 2-letter country code [XXX] of the territory of broadcast for the service.	2-char string	Required

Ben Poor 12/12/13 14:48

**Comment [30]:** Need to expand here with some examples

Ben Poor 12/12/13 14:52

**Comment [31]:** May need to move this to the implementation specific section for all documents.

Ben Poor 12/12/13 15:04

**Comment [32]:** It is possible to abstract this construction (which is the same as the RadioVIS Topic Construction) and refer to the common functionality. Call it something like Bearer Path, and put it in the RadioDNS specification.

This would help as we refer to this from both the PI and GI document paths.

Ben Poor 9/1/14 12:47

**Comment [33]:** Again, awful english.

Ben Poor 9/1/14 12:55

**Comment [34]:** Again, awful english.

eid	<b>Ensemble Identifier (EId)</b> Service broadcast multiplex ensemble ID code.	4-char hexadecimal	Required
sid	<b>Service Identifier (SId)</b> Service broadcast identifier.	4 or 8-char hexadecimal	Required
scids	<b>Service Component Identifier within the Service (SCIDs)</b> Service broadcast component identifier within the service.	1 or 3-char hexadecimal	Required

If the audio service is delivered as data via X-PAD, the following additional parameter is mandatory:

Parameters	Description	Value	Status
appty-uatype	<b>X-PAD Application Type (AppTy) and User Application type (UATYPE)</b> The X-PAD Application Type number and User Application Type, concatenated with a hyphen (only for applications broadcast in X-PAD). Where Application Types are allocated in pairs, the lower value (indicating the start of the application data group) must be used.	2-char hexadecimal, hyphen, 3-char hexadecimal	Required, when referring to an X-PAD component, otherwise omitted

If the service is delivered as data in an independent Service Component, the following additional parameter is mandatory:

Parameters	Description	Value	Status
pa	<b>Packet Address</b> Packet address of the data service delivering the audio service.	integer, between 1 and 1023	Required, when referring to a data service component, otherwise omitted

For a detailed explanation on these parameters and their values, please refer to the DAB/DAB+ section of RDNS01 [XXX].

### 9.1.2.3 Digital Radio Mondiale (DRM)/AM Signalling System (AMSS)

The broadcast parameters value for a DRM/AMSS service PI request URI is constructed as follows:

(drm|amss)/<sid>

The parameters are populated with the following values:

Parameters	Description	Value	Status
sid	<b>Service Identifier (SId)</b> Service broadcast identifier.	6-char hexadecimal	Required

For a detailed explanation on these parameters and their values, please refer to the DRM/AMSS section of RDNS01 [XXX].

### 9.1.2.4 iBiquity Digital Corporation's HD Radio™ (HD Radio™)

The broadcast parameters value for a HD Radio™ [XXX] service PI request URI is constructed as follows:

hd/<cc>/<tx>

The parameters are populated with the following values:

Parameters	Description	Value	Status
cc	<b>Country Code</b>	3-char	Required

	Service broadcast country code	hexadecimal	
tx	<b>Transmitter Identifier</b> Service broadcast identifier	5-char hexadecimal	Required

For a detailed explanation on these parameters and their values, please refer to the HD Radio™ section of RDNS01 [2].

### 9.1.2.5 IP-delivered audio service

The broadcast parameters value for a request URI when receiving IP-delivered audio is constructed as follows:

id/<fqdn>/<sid>

The parameters are populated with the following values:

Parameters	Description	Value	Status
fqdn	<b>Authoritative FQDN</b> This shall match the <b>fqdn</b> parameter signalled within the audio IP stream, if signalled, as per the RadioDNS Specification [XXX].  This shall also match the <b>fqdn</b> attribute on the <b>radiodns</b> element of the service in the relevant SI document (see Section XXX, radiodns).	Valid domain name	Required
sid	<b>Service Identifier</b> This shall match the <b>serviceIdentifier</b> parameter signalled within the audio IP stream, if signalled, as per the RadioDNS Specification [XXX].  This shall also match the <b>serviceIdentifier</b> attribute on the <b>radiodns</b> element of the service in the relevant SI document.	Maximum 16 lower case characters in the range [a-z0-9]	Required

## 9.3 Group Information

My initial thoughts are that the Group Information file should reside in the same path structure as for the PI files, and thus subject to the same path requirements. This means that nominally there is one GI file per service, but that is a *good thing* for ingesting devices, and this base requirement can always be expanded upon by using content negotiation, user-agents, etc.

We would thus begin by describing this file as containing all the groups for that service on that bearer – which is analogous to the way in which it is (theoretically) used in DAB EPG – one GI file per ensemble. Again, it would be useful to set expectations of size, etc. as there is no current upper limit via HTTP.

## 9.4 Implementation Requirements

This section (or ones in each of 9.1, 9.2, 9.3) will need to detail requirements to implementors (service providers, devices) on which to implement, what rules to follow. Below is a variant on the existing REPG requirements:

For service providers implementing discovery through RadioDNS:

- You shall support implementation of Section XXX, RadioDNS Lookup.
- You are strongly recommended to support implementation of document discovery on the standard HTTP port 80, due to the possibility that traffic on a non-standard port may be rejected by firewall/proxy configurations.
- You are strongly recommended to support implementation of Section XXX, Website Link
- You are strongly recommended to support implementation of Section XXX, Known Location on station domain

For device manufacturers and developers implementing a RadioEPG client:

- You shall implement at least one method for discovering SI documents.
- You are recommended to discover the SI document immediately upon starting reception of a service.

- You are recommended to cache any discovered documents as per standard HTTP behaviour.

For directory service providers implementing the ingestion of RadioEPG documents:

- You shall implement at least one method for discovering XSI documents.
- You are strongly recommended to discover XSI documents by using Section XXX Website Link, or Section XXX Known Location on station domain



---

## 10. Broadcast/IP Service Following

Intelligent switching between broadcast and streaming can be used to provide the device with a common experience between different bearers of the same service, appropriate to the situation. It can also optimise the costs to both device and service provider, associated with the different bearers, e.g. by using broadcast instead of IP streaming.

Service following can be defined globally in the SI document, or on a per-programme basis in the relevant PI document if available.

### 10.1 Initial Bearer Selection

For a situation where a device is not already receiving a service, it is up to the device how it select an initial bearer. It is recommended that this be a function of device preference, user preference and indicated bearer cost.

A device should determine the relative preference between certain bearers based on its own functionality (e.g. what bearers the device is able to use, available codecs).

A device may wish to expose a degree of choice of bearer to the user and allow them to indicate a preference to a particular bearer. This may also be an indirect consequence of a user action – for example, if a user deactivates Wi-Fi functionality on a mobile/cellular network phone, the device may decide to use FM instead of IP streaming over mobile data.

A *cost* is indicated against each bearer for a service, as determined by the service provider and indicates an order of preference *in respect to the service provider*. This is a relative non-negative non-zero integer, which may be used to select the *most preferred* bearer from the bearer list. The bearer with the lower cost value should be preferred when performing a comparison.

A device should start from the most preferred bearer and work down the list until it is deemed a successful reception has been made. A device should apply its own rules to determine what constitutes a successful reception, such as whether the broadcast signal quality is sufficiently strong, or whether an IP connection can be made and the available bandwidth is sufficient.

### 10.2 Bearer Switching Behaviour

Service following information provided in the SI document enables a device to consider a transition to IP streaming of the current service when all possible service following possibilities in the broadcast domain for the current service have been exhausted. It also allows a device receiving a service through IP streaming to consider switching to the same service on a broadcast bearer.

In all cases, the provided bearer cost should be considered in the decision to switch between broadcast and IP, and when deciding which of either broadcast or IP to switch to if multiple equitable options are available.

Information provided in the SI is not intended to be used in preference to information provided by a broadcast platform, such as AF information in RDS-FM and Service Following information in DAB. Where the broadcast platform allows signalling of similar services, such as Soft Links in DAB, the device may decide whether to offer the user a switch to the same service on IP streaming, or one of the alternative similar services specified in the broadcast domain.

For example, consider a service being received on DAB. DAB Service Following provides alternative locations for the current service on other ensembles and on FM radio, but the device finds that none are of an acceptable signal quality.

The device inspects the Service Following information, finds an appropriate IP streaming bearer for the current service, and switches to that. The device continues to monitor the broadcast signals available to it, and finds at a later time that the same service is now available with equitable signal qualities on both DAB and FM.

The service provider has specified a lower cost for the DAB bearer, so the device switches from IP Streaming to DAB. Devices should implement appropriate strategies for managing the frequency and duration of switches between IP and broadcast.

The value for an *offset* of a particular bearer, in milliseconds relative to other bearers in the same document, may allow the device to implement functionality to attempt co-timing when switching bearers, or to assist a decision as to the most appropriate bearer. It should be noted that any offset is an indicative, rather than precise value.

### 10.3 Implementation

The following matrix gives the conditions under which Service Following to another bearer may or may not be implemented by a device:

SI Available	PI Available		Device Behaviour
	Bearers defined for this service	Bearers defined in current programme	
N	N	-	Service following <b>not</b> allowed
Y	N	-	Service following allowed to bearers defined for this service, within the SI
Y	Y	N	Service following allowed to bearers defined for this service, within the SI
Y	Y	Y	Service following allowed to bearers defined for the current programme, within the location element of the PI
N	Y	Y	Service following allowed to bearers defined for the current programme, within the location element of the PI
N	Y	N	Service following <b>not</b> allowed

*Available* and *Unavailable* refer to whether a document (SI or PI) can or cannot be retrieved using HTTP as per Section XXX, Document Retrieval (actually now over a few subsections!).

*Bearer present* refers to a bearer being within the document, either within the `service` element of the SI file, or the `schedule` element of the current programme within the PI file. This signals that the bearer is allowed for that service/programme.

*Bearer missing* refers to a bearer not being within the document, either within the `service` element of the SI file, or the `schedule` element of the current programme within the PI file. This signals that the bearer is not allowed for that service/programme.

A Service Provider may wish to signal different bearer availability on a per-programme for a variety of reasons, e.g. to enforce licensing restrictions.

## 10.4 Bearer Matching

A device may ingest an SI document for a variety of reasons. For example, in order to determine which service is currently being received and its associated metadata, or to find other bearers the service can be received on.

The implementation of this should be through *Bearer Matching*, i.e. constructing the URI of the currently received bearer using the methods described in Section XXX, Bearer URI Construction. This URI can then be matched against bearers within the SI document to find the relevant service(s). Note that more than one service may be matched, at which point a device may take additional steps to match the current service, for example by using location information.

As well as matching bearers by the above method, it is recommended that a device also use any available additional bearer parameters (e.g. bitrate, MIME type).

---

## Annex A (normative): URI scheme for postal addresses

This clause defines a URI scheme for defining postal addresses. The format is a URI-compliant and case insensitive string in the form:

```
addressuri = "postal:" addressdata
addressdata = segment * ("/" segment)
segment     = *urlchar
urlchar     = unreserved | escaped
```

Either the most generalized part OR the most localized part of the address should come first (depending on the postal scheme practices of the target country), separating each main fragment with a slash ("/"), through the hierarchy until the most localized/generalized resource is reached. `unreserved` and `escaped` are defined in RFC 3986 [XXX].

NOTE: Where "/" is needed as a character in the address (e.g. "20/22 High St") it should be encoded as the hex equivalent (i.e. "%2F").

For example:

```
postal:BBC%20Research%20and%20Development/Kingswood%20Warren/Tadworth/Surrey/KT20%206NP/United%20Kingdom/
```

## Annex B (normative): Document Schema

The following XSD declaration defines the schema and datatypes for the 3 document types detailed in this specification: Service Information (SI), Programme Information (PI) and Group Information (GI). The schema is referred to from each of these by its filename: `epg_16.xsd`.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://www.worlddab.org/schemas/epg"
  xmlns="http://www.worlddab.org/schemas/epg"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:georss="http://www.georss.org/georss/10"
  elementFormDefault="qualified" attributeFormDefault="unqualified">

  <xs:import namespace="http://www.w3.org/XML/1998/namespace"
    schemaLocation="http://www.w3.org/2001/xml.xsd" />

  <xs:import namespace="http://www.georss.org/georss/10"
    schemaLocation="http://georss.org/xml/1.0/georss.xsd" />

  <!-- ##### -->
  <!-- Common Datatypes -->
  <!-- ##### -->

  <!-- Definition of bearerType -->
  <xs:complexType name="bearerType">
    <xs:attribute name="id" type="xs:anyURI" />
    <xs:attribute name="mime" type="mimeType" />
    <xs:attribute name="bitrate" type="xs:nonNegativeInteger" />
    <xs:attribute name="cost" type="xs:nonNegativeInteger" />
    <xs:attribute name="offset" type="xs:nonNegativeInteger" default="0" />
  </xs:complexType>

  <!-- Definition of keywordsType -->
  <xs:complexType name="keywordsType">
    <xs:simpleContent>
      <xs:restriction base="textType" />
    </xs:simpleContent>
  </xs:complexType>

  <!-- Definition of multimediaType -->
  <xs:complexType name="multimediaType">
    <xs:attribute name="mime" type="mimeType" use="optional" />
    <xs:attribute ref="xml:lang" default="en" />
    <xs:attribute name="url" type="xs:anyURI" />
    <xs:attribute name="width" type="xs:nonNegativeInteger" />
    <xs:attribute name="height" type="xs:nonNegativeInteger" />
  </xs:complexType>

  <!-- Definition of scheduleType -->
  <xs:complexType name="scheduleType">
    <xs:sequence>
      <xs:choice>
        <xs:element name="time" maxOccurs="unbounded">
          <xs:complexType>
            <xs:attribute name="time" type="xs:dateTime" use="required" />
            <xs:attribute name="duration" type="xs:duration" use="required" />
            <xs:attribute name="actualTime" type="xs:dateTime" />
            <xs:attribute name="actualDuration" type="xs:duration" />
          </xs:complexType>
        </xs:element>
        <xs:element name="relativeTime" maxOccurs="unbounded">
          <xs:complexType>
            <xs:attribute name="time" type="xs:duration" use="required" />
            <xs:attribute name="duration" type="xs:duration" use="required" />
            <xs:attribute name="actualTime" type="xs:duration" />
            <xs:attribute name="actualDuration" type="xs:duration" />
          </xs:complexType>
        </xs:element>
      </xs:choice>
      <xs:element name="bearer" type="bearerType" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
```

```

<!-- Definition of memberOfType -->
<xs:complexType name="memberOfType">
  <xs:attribute name="id" type="CRIDType" use="optional" />
  <xs:attribute name="index" type="xs:positiveInteger" use="optional" />
</xs:complexType>

<!-- Definition of linkType -->
<xs:complexType name="linkType">
  <xs:attribute name="uri" type="xs:anyURI" use="required" />
  <xs:attribute name="mime" type="mimeType" />
  <xs:attribute ref="xml:lang" default="en" />
  <xs:attribute name="description">
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:maxLength value="180" />
      </xs:restriction>
    </xs:simpleType>
  </xs:attribute>
  <xs:attribute name="expiryTime" type="xs:dateTime" />
</xs:complexType>

<!-- Definition of programmeType -->
<xs:complexType name="programmeType">
  <xs:sequence>
    <xs:group ref="scheduleNameGroup" maxOccurs="unbounded" />
    <xs:element name="schedule" type="scheduleType" maxOccurs="unbounded" />
    <xs:element name="multimedia" type="multimediaType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="genre" type="genreType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="keywords" type="keywordsType" minOccurs="0" />
    <xs:element name="memberOf" type="memberOfType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="link" type="linkType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="programmeEvent" type="programmeEventType" minOccurs="0"
maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="id" type="CRIDType" use="optional" />
  <xs:attribute ref="xml:lang" use="optional" default="en" />
</xs:complexType>

<!-- Definition of programmeEventType -->
<xs:complexType name="programmeEventType">
  <xs:sequence>
    <xs:group ref="scheduleNameGroup" maxOccurs="unbounded" />
    <xs:element name="schedule" type="scheduleType" maxOccurs="unbounded" />
    <xs:element name="multimedia" type="multimediaType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="genre" type="genreType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="keywords" type="keywordsType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="memberOf" type="memberOfType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="link" type="linkType" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="id" type="CRIDType" use="optional" />
  <xs:attribute ref="xml:lang" use="optional" default="en" />
</xs:complexType>

<!-- Definition of messageType -->
<xs:complexType name="textType" abstract="true">
  <xs:simpleContent>
    <xs:extension base="xs:string">
      <xs:attribute ref="xml:lang" use="optional" default="en" />
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>

<!-- Definition of shortNameType -->
<xs:complexType name="shortNameType">
  <xs:simpleContent>
    <xs:restriction base="textType">
      <xs:maxLength value="8" />
    </xs:restriction>
  </xs:simpleContent>
</xs:complexType>

<!-- Definition of mediumNameType -->
<xs:complexType name="mediumNameType">
  <xs:simpleContent>
    <xs:restriction base="textType">
      <xs:maxLength value="16" />
    </xs:restriction>
  </xs:simpleContent>
</xs:complexType>

```

```

</xs:complexType>

<!-- Definition of longNameType -->
<xs:complexType name="longNameType">
  <xs:simpleContent>
    <xs:restriction base="textType">
      <xs:maxLength value="128" />
    </xs:restriction>
  </xs:simpleContent>
</xs:complexType>

<!-- Definition of shortDescriptionType -->
<xs:complexType name="shortDescriptionType">
  <xs:simpleContent>
    <xs:restriction base="textType">
      <xs:maxLength value="180" />
    </xs:restriction>
  </xs:simpleContent>
</xs:complexType>

<!-- Definition of longDescriptionType -->
<xs:complexType name="longDescriptionType">
  <xs:simpleContent>
    <xs:restriction base="textType">
      <xs:maxLength value="1200" />
    </xs:restriction>
  </xs:simpleContent>
</xs:complexType>

<!-- Definition of originatorType -->
<xs:simpleType name="originatorType">
  <xs:restriction base="xs:string">
    <xs:maxLength value="128" />
  </xs:restriction>
</xs:simpleType>

<!-- Definition of genreType -->
<xs:complexType name="genreType">
  <xs:simpleContent>
    <xs:extension base="xs:string">
      <xs:attribute name="href" type="xs:anyURI" use="required" />
      <xs:attribute name="type" use="optional" default="main">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="main" />
            <xs:enumeration value="secondary" />
            <xs:enumeration value="other" />
          </xs:restriction>
        </xs:simpleType>
      </xs:attribute>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>

<!-- Definition of CRIDType -->
<xs:simpleType name="CRIDType">
  <xs:restriction base="xs:anyURI">
    <xs:whiteSpace value="collapse" />
    <xs:pattern value="(c|C)(r|R)(i|I)(d|D)://.*/*" />
  </xs:restriction>
</xs:simpleType>

<!-- Definition of mimeType (Multipurpose Internet Mail Extension -->
<xs:simpleType name="mimeType">
  <xs:restriction base="xs:string">
    <xs:whiteSpace value="collapse" />
    <xs:pattern value="([!-\.\0-~]{1,}/[!-\.\0-~]{1,})+" />
  </xs:restriction>
</xs:simpleType>

<!-- Definition of scheduleNameGroup -->
<xs:group name="scheduleNameGroup">
  <xs:sequence>
    <xs:element name="shortName" type="shortNameType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="mediumName" type="mediumNameType" maxOccurs="unbounded" />
    <xs:element name="longName" type="longNameType" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
</xs:group>

```

```

<!-- Definition of serviceNameGroup -->
<xs:group name="serviceNameGroup">
  <xs:sequence>
    <xs:element name="shortName" type="shortNameType" maxOccurs="unbounded" />
    <xs:element name="mediumName" type="mediumNameType" maxOccurs="unbounded" />
    <xs:element name="longName" type="longNameType" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
</xs:group>

<!-- Definition of descriptionGroup -->
<xs:group name="descriptionGroup">
  <xs:sequence>
    <xs:element name="shortDescription" type="shortDescriptionType" minOccurs="0"
maxOccurs="unbounded" />
    <xs:element name="longDescription" type="longDescriptionType" minOccurs="0"
maxOccurs="unbounded" />
  </xs:sequence>
</xs:group>

<!-- ##### -->
<!-- Service Information -->
<!-- ##### -->
<xs:annotation>
  <xs:documentation xml:lang="en">
    Service information includes the structure of and information about the
multiplex and its associated services
  </xs:documentation>
</xs:annotation>

<!-- Definition of root serviceInformation element -->
<xs:element name="serviceInformation">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="services" minOccurs="0" maxOccurs="1">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="serviceProvider" type="serviceProviderType" minOccurs="0"
maxOccurs="1" />
            <xs:element name="service" type="serviceType" minOccurs="0"
maxOccurs="unbounded" />
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name="serviceGroups" minOccurs="0" maxOccurs="1">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="serviceGroup" type="serviceGroupType" maxOccurs="unbounded"
/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
    <xs:attribute name="creationTime" type="xs:dateTime" />
    <xs:attribute name="originator" type="originatorType" />
    <xs:attribute ref="xml:lang" use="required" />
  </xs:complexType>
</xs:element>

<!-- Definition of serviceProvider -->
<xs:complexType name="serviceProviderType">
  <xs:choice maxOccurs="unbounded">
    <xs:group ref="serviceNameGroup" maxOccurs="unbounded" />
    <xs:group ref="descriptionGroup" maxOccurs="unbounded" />
    <xs:element name="multimedia" type="multimediaType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="keywords" type="keywordsType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="link" type="linkType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="location" type="locationType" minOccurs="0" maxOccurs="1" />
  </xs:choice>
</xs:complexType>

<!-- Definition of serviceType -->
<xs:complexType name="serviceType">
  <xs:choice maxOccurs="unbounded">
    <xs:element name="bearer" type="bearerType" minOccurs="0" maxOccurs="unbounded" />
    <xs:group ref="serviceNameGroup" maxOccurs="unbounded" />
    <xs:group ref="descriptionGroup" maxOccurs="unbounded" />
  </xs:choice>
</xs:complexType>

```

Ben Poor 24/12/13 11:54

**Comment [35]:** Define whether service Groups are shared between SI or namespaced to a specific SI. i.e. the case where two groups have the same ID – we would NOT want services to be put in the same group on a device.

```

<xs:element name="multimedia" type="multimediaType" minOccurs="0" maxOccurs="unbounded" />
<xs:element name="genre" type="genreType" minOccurs="0" maxOccurs="unbounded" />
<xs:element name="keywords" type="keywordsType" minOccurs="0" maxOccurs="unbounded" />
<xs:element name="link" type="linkType" minOccurs="0" maxOccurs="unbounded" />
<xs:element name="radiodns" type="radiodnsType" minOccurs="0" maxOccurs="1" />
<xs:element name="location" type="locationType" minOccurs="0" maxOccurs="1" />
<xs:element name="serviceGroupMember" maxOccurs="unbounded">
  <xs:complexType>
    <xs:attribute name="id" type="xs:string" use="required"/>
  </xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>

<!-- Definition of radiodnsType -->
<xs:complexType name="radiodnsType">
  <xs:attribute name="fgdn" type="xs:string" use="required" />
  <xs:attribute name="serviceIdentifier" use="required" >
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="[a-z0-9]*/>
        <xs:minLength value="1"/>
        <xs:maxLength value="16"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:attribute>
</xs:complexType>

<!-- Definition of locationType -->
<xs:complexType name="locationType">
  <xs:choice maxOccurs="unbounded">
    <xs:element name="point" type="georss:point" />
    <xs:element name="polygon" type="georss:polygon" />
    <xs:element name="country" type="xs:string" />
  </xs:choice>
</xs:complexType>

<!-- Definition of groupType -->
<xs:complexType name="serviceGroupType">
  <xs:choice maxOccurs="unbounded">
    <xs:group ref="serviceNameGroup" maxOccurs="unbounded" />
    <xs:group ref="descriptionGroup" maxOccurs="unbounded" />
    <xs:element name="multimedia" type="multimediaType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="genre" type="genreType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="keywords" type="keywordsType" minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="link" type="linkType" minOccurs="0" maxOccurs="unbounded" />
  </xs:choice>
  <xs:attribute name="id" type="xs:string" />
</xs:complexType>

<!-- ##### -->
<!-- Programme Information -->
<!-- ##### -->

<xs:element name="epg">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="scope" minOccurs="0">
        <xs:complexType>
          <xs:attribute name="startTime" type="xs:dateTime" use="required" />
          <xs:attribute name="stopTime" type="xs:dateTime" use="required" />
        </xs:complexType>
      </xs:element>
      <xs:element name="programme" type="programmeType" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="creationTime" type="xs:dateTime" />
    <xs:attribute name="originator" type="originatorType" />
  </xs:complexType>
</xs:element>

<!-- ##### -->
<!-- Group Information -->
<!-- ##### -->

<xs:element name="programmeGroups">
  <xs:complexType>
    <xs:sequence>

```



```
<xs:element name="programmeGroup" maxOccurs="unbounded">
  <xs:complexType>
    <xs:choice maxOccurs="unbounded">
      <xs:group ref="scheduleNameGroup" />
      <xs:group ref="descriptionGroup" />
      <xs:element name="multimedia" type="multimediaType" />
      <xs:element name="genre" type="genreType" />
      <xs:element name="keywords" type="keywordsType" />
      <xs:element name="memberOf" type="memberOfType" />
      <xs:element name="link" type="linkType" />
    </xs:choice>
    <xs:attribute name="id" type="CRIDType" use="required" />
    <xs:attribute name="type">
      <xs:simpleType>
        <xs:restriction base="xs:NMTOKEN">
          <xs:enumeration value="series" />
          <xs:enumeration value="show" />
          <xs:enumeration value="programConcept" />
          <xs:enumeration value="magazine" />
          <xs:enumeration value="programCompilation" />
          <xs:enumeration value="otherCollection" />
          <xs:enumeration value="otherChoice" />
          <xs:enumeration value="topic" />
        </xs:restriction>
      </xs:simpleType>
    </xs:attribute>
    <xs:attribute name="numOfItems" type="xs:positiveInteger" />
  </xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute name="creationTime" type="xs:dateTime" />
<xs:attribute name="originator" type="originatorType" />
</xs:complexType>
</xs:element>
</xs:schema>
```

## Annex C (normative): Bearer URI Construction

A bearer may be expressed in a URI format [XXX], with the format specific to the bearer platform. The following sections detail the schemes as defined within this version of the RadioEPG specification.

### C.1 VHF/FM

The bearer string for a VHF/FM service is constructed as follows:

```
fm:<country>.<pi>.<freq>
```

The parameters are populated with the following values:

Parameters	Description	Value	Status
country	<b>ISO 3166 two-letter country code</b> The ISO 3166-1 alpha-2 2-letter country code [XXX] of the territory of broadcast.	2-char string	Required
pi	<b>Programme Identification (PI)</b> Service broadcast RDS PI code.	4-char hexadecimal	Required
frequency	<b>Frequency</b> Frequency on which the service broadcast is received, formatted to 5 characters in units of 100KHz. Frequencies below 100MHz must be supplied with a leading zero, for example 95.8MHz would be represented as 09580, 104.9MHz as 10490.	5-char string	Required

For a detailed explanation on these parameters and their values, please refer to the VHF/FM section of RDNS01 [XXX].

### C.2 DAB/DAB+ Digital Radio

The bearer string for a DAB/DAB+ Digital Radio service is constructed as follows:

```
dab:<country>.<eid>.<sid>.<scids>[.(<appty-uetype>|<pa>)]
```

The parameters are populated with the following values:

Parameters	Description	Value	Status
country	<b>ISO 3166 two-letter country code</b> The ISO 3166-1 alpha-2 2-letter country code [XXX] of the territory of broadcast.	2-char string	Required
eid	<b>Ensemble Identifier (Eid)</b> Service broadcast multiplex ensemble ID code.	4-char hexadecimal	Required
sid	<b>Service Identifier (Sid)</b> Service broadcast identifier.	4 or 8-char hexadecimal	Required
scids	<b>Service Component Identifier within the Service (SCIDs)</b> Service broadcast component identifier within the service.	1 or 3-char hexadecimal	Required

If an audio service is delivered as data via X-PAD, the following additional parameter is mandatory:

Parameters	Description	Value	Status
appty-uetype	<b>X-PAD Application Type (AppTy) and User Application type (Uatyp)</b> The X-PAD Application Type number and User	2-char hexadecimal, hyphen, 3-char hexadecimal	mandatory, when referring to an X-PAD

Ben Poor 11/12/13 16:00

**Comment [36]:** This is terrible english and needs a better explanation

	Application Type, concatenated with a hyphen (only for applications broadcast in X-PAD). Where Application Types are allocated in pairs, the lower value (indicating the start of the application data group) must be used.		<i>component, otherwise omitted</i>
--	---	--	-------------------------------------

If an audio service is delivered as data in an independent Service Component, the following additional parameter is mandatory:

Parameters	Description	Value	Status
pa	<b>Packet Address</b> Packet address of the data service delivering the audio service.	<i>integer, between 1 and 1023</i>	<i>mandatory, when referring to a data service component, otherwise omitted</i>

For a detailed explanation on these parameters and their values, please refer to the DAB/DAB+ section of RDNS01 [XXX].

## C.2 Digital Radio Mondiale (DRM)/AM Signalling System (AMSS)

The bearer string for a DRM/AMSS service is constructed as follows:

`(drm|amss):<sid>`

The parameters are populated with the following values:

Parameters	Description	Value	Status
sid	<b>Service Identifier (Sid)</b> Service broadcast identifier.	<i>6-char hexadecimal</i>	mandatory

For a detailed explanation on these parameters and their values, please refer to the DRM/AMSS section of RDNS01 [XXX].

## C.3 iBiquity Digital Corporation's HD Radio™ (HD Radio™)

The bearer string for a HD Radio™ [7] service is constructed as follows:

`hd:<cc>.<tx>.<frequency>`

The parameters are populated with the following values:

Parameters	Description	Value	Status
cc	<b>Country Code</b> Service broadcast country code	<i>3-char hexadecimal</i>	<i>mandatory</i>
tx	<b>Transmitter Identifier</b> Service broadcast identifier	<i>5-char hexadecimal</i>	<i>mandatory</i>
frequency	<b>Frequency</b> Frequency on which the service broadcast is received, formatted to 5 characters in units of 100KHz. Frequencies below 100MHz must be supplied with a leading zero, for example 95.9MHz would be represented as 09590, 104.9MHz as 10490.	<i>5-char string</i>	

For a detailed explanation on these parameters and their values, please refer to the HD Radio™ section of RDNS01 [XXX].

## C.4 HTTP-based

The bearer string takes the form of a valid URL as defined in the HTTP specification [XXX]. For example:

```
http://media-ice.musicradio.com/Capital
```

## C.5 Other Bearers

While other bearers exist over which audio can be carried (e.g. DVB, IPTV, etc.) this version of the specification does not define the format by which they may be expressed.

## Annex D (normative): Guidance for usage of Linked Content

The **link** element may be used within SI and PI files in order to indicate additional *linked* content from the parent element. This will link out to external resources, which devices may make use of.

The use of an external resource depends on factors such as whether it is capable of making use of the resource, and possible user choice or preferences. The resource may be shown/indicated to a user or it may be ingested as part of a process on the device.

No specific behaviour is mandated, and the following sections serve to provide guidance as to ways in which a device may use this information including, but not limited to:

- Service/Group/Programme website links
- Podcasts/On-Demand content
- External identities for the Service/Group/Programme

The attributes of the link should be used in the following manner:

Parameters	Description
url	<b>Link URI</b> The URI may be deconstructed and examined to infer context, particularly by using the URI Scheme (HTTP, FTP, etc.) to determine a particular protocol. Depending on the protocol, the rest of the URI may then be examined for additional context. For example, an HTTP URI contains a host that may be used to infer the context of the link.
mime	<b>MIME Type</b> May used to gather more context on the format of the resource, and potentially what it represents.
xml:lang	<b>Language</b> Indicates the language of the linked resource. This is most useful when the same link is being provided in different languages (i.e. for multilingual services/programmes/groups), to be used to select the most appropriate from a group of similar links.

The following sections give guidance for specific examples:

### D.1 Website Links

This indicates related HTTP content, usable by a web browser. Several abridged examples are shown below.

#### D.1.1 Programme Links

Showing a link to programme information on the station website, and a microsite for a specific feature within the programme:

```
<programme id="crld://thisisglobal.com/1190223">
  ...
  <link url="http://www.capitalfm.com/on-air/breakfast-show" />
  <link url="http://www.capitalfm.com/timetunnel" description="Can you guess the
year?" />
  ...
</programme/>
```

In the above example, no MIME Type is specified on either link. However, context can still be inferred from the URI scheme (HTTP), such that a device may reasonably expect the content to be displayable in a Web Browser.

#### D.1.2 Service Links

Showing the station homepage, and entry on Wikipedia:

```
<service>
```

```
...
<link uri="http://www.capitalfm.com/london" mime="text/html"/>
<link uri="http://en.wikipedia.org/wiki/Capital_London" mime="text/html"
xml:lang="en"/>
...
</service>
```

The links should be ordered in such a way that the most significant link appears first, for the purposes of disambiguating between otherwise equally significant links.

For example, a Broadcaster may order the list in such a way that the first link with an HTTP scheme to their own domain refers to their Company, Service, Brand or Programme website.

## D.2 Podcasts/On-Demand Content

Podcast and on-demand information could be specified as a link from a Service, Programme or Group.

A device may interpret linked content as a podcast from its MIME type. For example, extending the example given in XXX, a Programme linking to an RSS and an Atom feed:

```
<programme id="crld://thisisglobal.com/1190223">
...
<link uri="http://www.capitalfm.com/on-air/breakfast-show/podcast"
mime="application/rss+xml" />
<link uri="http://www.capitalfm.com/on-air/breakfast-show/podcast"
mime="application/atom+xml" />
...
</programme/>
```

Podcasts and On-Demand content may be included in any number of formats, not limited to RSS and Atom, available over a range of protocols/methods. A device may select appropriate feeds to use based on a number of factors, such as the indicated MIME Type (if given), structure of the URI, or the result of acquiring the feed and examining it.

### D.3 External Identities

A Service, Programme or Group could have identities external to the Broadcaster, e.g. within a directory service or aggregator.

Providing the link between this identity and the Broadcaster's own service definition enables the metadata in both these places to be associated, or to use the combined information in a specific way such as within an application on a mobile device.

The identity should be formatted in a way that is specific to the provider of that identity, typically as a URL. For example, a service aggregator may hold information for a particular Service as indicated in the SI document:

```
<link uri="http://www.musicradio.com/directory/service-16859"
mime="text/html" />
```

Since this is the URL as supplied by the aggregator, it will be formatted in a way known to that aggregator – in this case, including a numeric identifier.

When the aggregator ingests the Broadcaster's SI file, it will be able to link from its own representation of the service to the Broadcaster's by identifying the service with this link. In this way, the URL is acting as a 'Foreign Key' between the two sources of information for that service.

A service may have multiple of these external identifiers, thereby allowing a network of identities between different providers to be linked together.

A URL such as the one shown in the above example may also be used as a normal HTTP URL to be displayed in a web browser on the device, in this case showing the aggregator's page on the service.

If the aggregator does not have the means to provide a URL containing the identity of the service, a URI may be specified, for example:

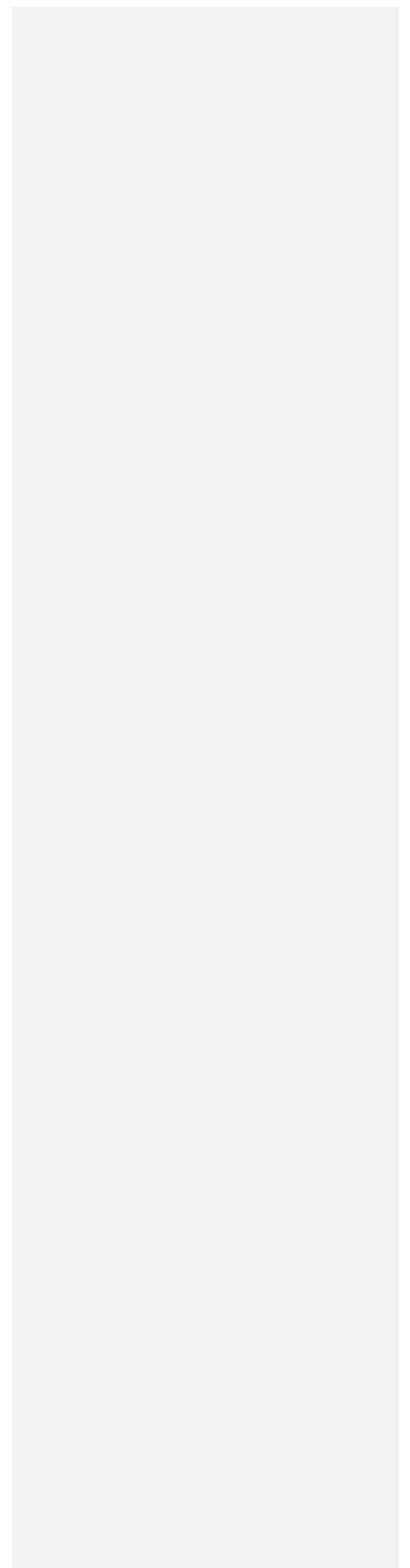
```
<link uri="musicradio:16859" />
```

As in the first example, the URI may be used as a key between the Broadcaster and the Aggregator. However, the device would need to know how to interpret this URI syntax, perhaps by launching an application capable of handling the URI.

### D.4 Contact Details

A Service, Programme or Group could have associated contact details, such as a Postal Address, telephone number [XXX] or SMS short code [XXX, combined with the protocol defined in XXX]. For example:

```
<link url="postal:Global%20Radio/30%20Leicester%20Square/London/WC2H%207LA" />
<link url="tel:+44-020-77666000" />
<link url="sms:83958" />
```





---

## Annex E (normative): Logo Usage

This annex gives specific requirements to broadcasters on effective signalling of station logos within a Service Information file, in order to allow receiver manufacturers to design user interfaces that provide a consistent and meaningful experience for the end user.

Modern devices are more likely to be supplied with highly graphical colour touchscreen interfaces, greatly expanding the scope for displaying station branding in a richer and more engaging way. Rather than a simple list of station names, logos and branding may assist in user discovery.

The signalling of logos for each service is highly recommended. When logos are provided the four required sizes are appropriate to device use cases, including:

- Display of station logo in a selection list.
- "Splash" screen used to display on a device while additional information is being acquired, or as a default.
- Display of station logo in a list of presets.
- Display of station logo to be used as a visual representation of the station (e.g. to be displayed as part of a social networking application action).

They also take into account the possible devices upon which this may be displayed, including but not limited to:

- Car radios.
- Portable devices (including integration within Mobile Phones).
- Tabletop radios.
- Tablets.
- Connected TV devices.
- Web Browsers.

### E.1 Basic Implementation

The provision of logos for groups, programmes and programme events is optional. However, when logos are provided for a service, five logos shall be provided, as detailed in section XXX.

### E.2 Extended Implementation

Broadcasters may choose, in addition to the basic implementation, to provide a greater range of logos sizes. By doing so, a broadcaster may overcome the restriction in the device of only being able to select the *closest* match for their display size.

For extended implementations, HTTP content negotiation may be used between an IP-connected device and the server providing the station logos, using no additional information in the SI file. Use of the SI file to signal and/or convey station logo images can therefore scale in terms of broadcaster support for different classes of device.

#### E.2.1 Content Negotiation

Upon acquisition and parsing of the SI document, the device will select an HTTP-locatable image (i.e. given as a URL with the **http** scheme) with dimensions closest to its own native screen size.

The device will then make an HTTP request to this resource, adding the following headers to its HTTP request.

Table I.2: HTTP request headers

Name	Value	Required
Display-Width	Display width in pixels	No
Display-Height	Display height in pixels	No
Display-PPI	Display pixel density in Pixels Per Inch (PPI)	No (default 72)

It is recommended that the standard HTTP request header **User-Agent** also be sent by the device when acquiring a logo. This should describe the general device profile, as in the HTTP specification, but shall not contain any user identifiable information.

These values *may* be used by the server providing the resource as additional information to select the most appropriate resource.

The resultant image returned may exactly match the requested dimensions, or may be close to these values, dependent on the ability of the broadcaster to supply exact image sizings. The broadcaster may decide to ignore the indicated device screen dimensions entirely, and will return an image of the dimensions signaled in the SI file for this URL, as these values are deemed to be the *default* dimensions.

The device shall therefore examine the dimensions of the returned image as they may not match the device screen dimensions. Padding and scaling in order to best fit the device may be performed, although the original aspect ratio of the image shall be preserved.

## E.2.2 Caching

It is recommended that the device use standard HTTP methods for checking whether a resource has changed since last acquisition, e.g. by using the *If-Modified-Since* parameter in the HTTP request for the resource. Similarly, it is recommended that the broadcaster respond to such requests in the expected way with the appropriate HTTP status code if the resource has not changed.

## E.3 Logo Scaling

The same logo is represented in different ways to most be most appropriate to the dimensions required. When preparing logos to fulfill the required sizes, it is not recommended to take a single image and simply scale this up or down.

For example, an image of 128x128 may look acceptable on a device with that same screen resolution:

If this is scaled down to 32x32 to be shown on a station list view, any text on the original image would be unreadable:



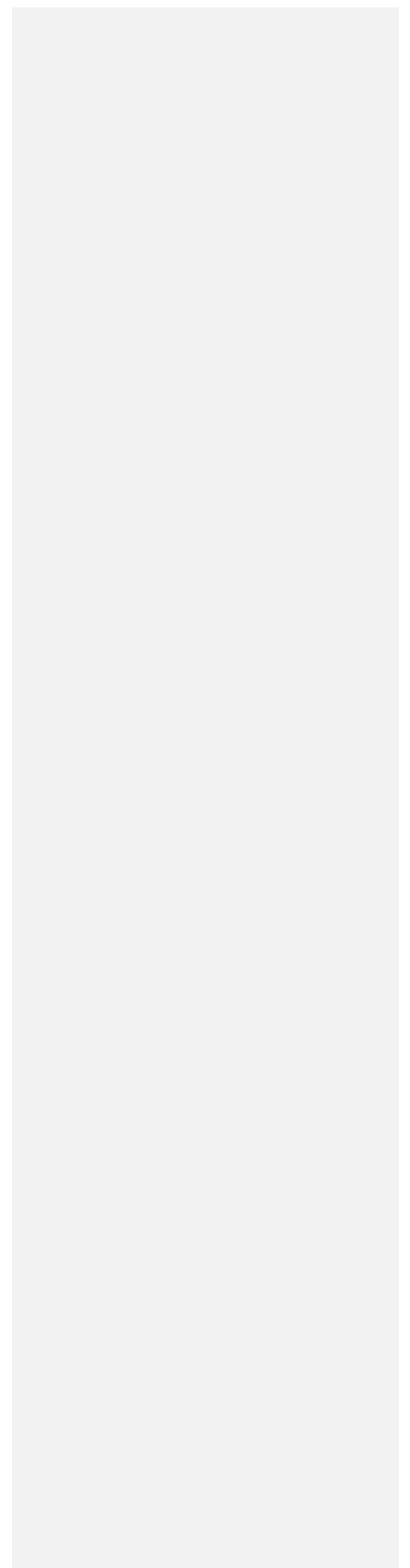
It is incorrect to assume that an image will scale to any dimension and its content remain equally as meaningful. In the above example, a simplified version of the above station logo may be more appropriate:

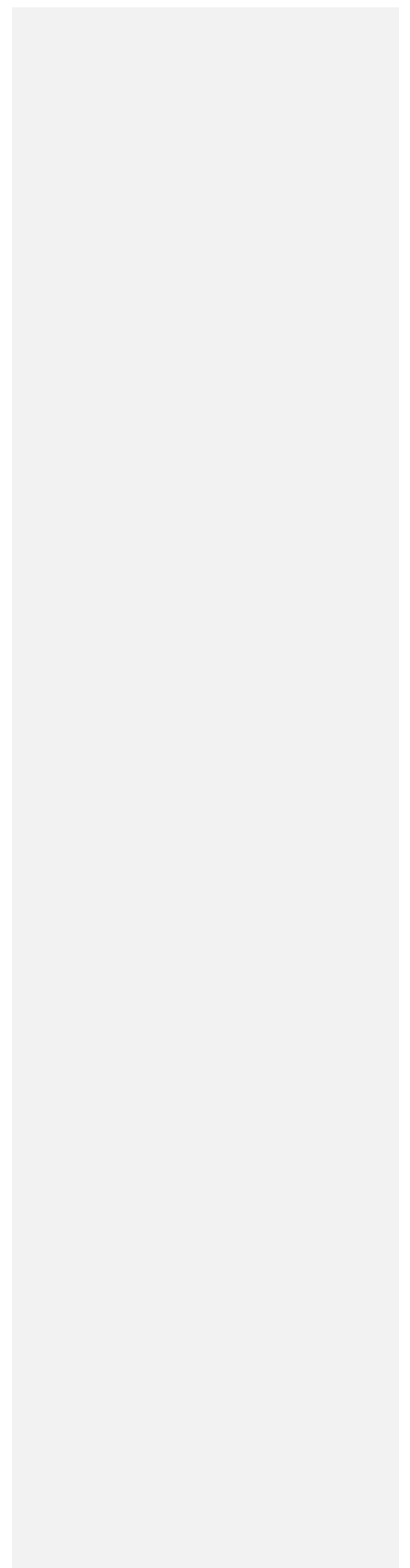


## E.4 Applicability to other logos and images

The previous sections give guidance on how a device may request more appropriate image sizes based on those signalled in the SI file. The same principles may be applied to logos and other images within PI and GI files – for Programme and Group images, respectively.

It is recommended that logos and images in PI and GI files are supplied in the same sizes as stations logos shall be given, and that Content Negotiation is supported between device and the provider of the logos.





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## History

<b>Document history</b>		
V1.1.1	December 2002	Publication
V1.2.1	January 2005	Publication
V1.3.1	February 2006	Publication
V1.4.1	June 2008	Publication
V1.5.1	August 2013	Publication
V1.6.1	January 2014	Draft