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Uniform Resource Identifier (URI) Scheme for Digital Video Broadcasting  
(DVB) Programme Resources  
[draft-mcroberts-uri-dvb-10](#)

Abstract

Uniform Resource Identifier (URI) schemes for broadcasting programme resources transmitted over MPEG-2 Transport Streams [[MPEG-Systems](#)] have been devised in their process of creating standards by the Digital Video Broadcasting Project (DVB), the Association of Radio Industries and Businesses in Japan (ARIB) and the OpenCable Application Platform (OCAP) to acquire current and future scheduled publications of broadcast media content from multimedia applications such as HTTP, MHP [[DVB-MHP](#)], OCAP [[OCAP1.0](#)] or other XML based metadata.

These URI are used to locate the actual digital TV, Radio or other multimedia broadcast programme services (i.e., channels or events) and also the audio-visual components related to that programme, for example an HTTP-based programme guide on the Web or other XML-based electronic programme guides in digital broadcast receivers.

This document defines the "dVB" URI scheme for the benefit of the Internet community, given its definition as part of the Digital Video Broadcasting (DVB) suite of ETSI standards.

Status of this Memo

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## **1. Introduction**

Standards governing televisions, set-top boxes and other consumer electronics devices have for some time been developed with the Internet in mind. The use of Universal Resource Identifiers (URIs) [[RFC3986](#)] is now commonplace, including for the purpose of identifying resources delivered by way of terrestrial, satellite and cable broadcasts.

For this purpose, a URI scheme was developed as part of the Digital Video Broadcasting [[DVB](#)] suite of standards specifically for the purpose of identifying broadcasts delivered by way of DVB-compliant broadcasting systems.

With the advent of digital broadcasting, digital multimedia broadcast services to the home, based on MPEG-2 Transport Streams [[MPEG-Systems](#)], have been widely available in recent years. Each broadcast programme and component (i.e. audio-visual and generic data components) are identifiable within the MPEG-2 Transport Stream. Beyond digital broadcast, television and radio programmes can be delivered to receivers over an IP-based network within MPEG-2 Transport Stream packets.

The Electronic Programme Guide (EPG) service for television and radio programmes which allows people to find and select programmes must be able to identify a given programme in a canonical form. As programme guides are increasingly being made available on the Web, and on-device programme guides are taking advantage of Internet connectivity, and as receiving devices are increasingly able to present programmes delivered both via digital broadcast and a variety of IP-based protocols, the the use of URIs to identify programmes is an obvious pragmatic choice.

This document defines the Uniform Resource Identifier (URI) schemes for broadcast programme resources over MPEG-2 Transport Stream [[MPEG-Systems](#)] for DVB services, conforming to the generic URI syntax [[RFC3986](#)] to aid in interoperability with existing IP-based services.

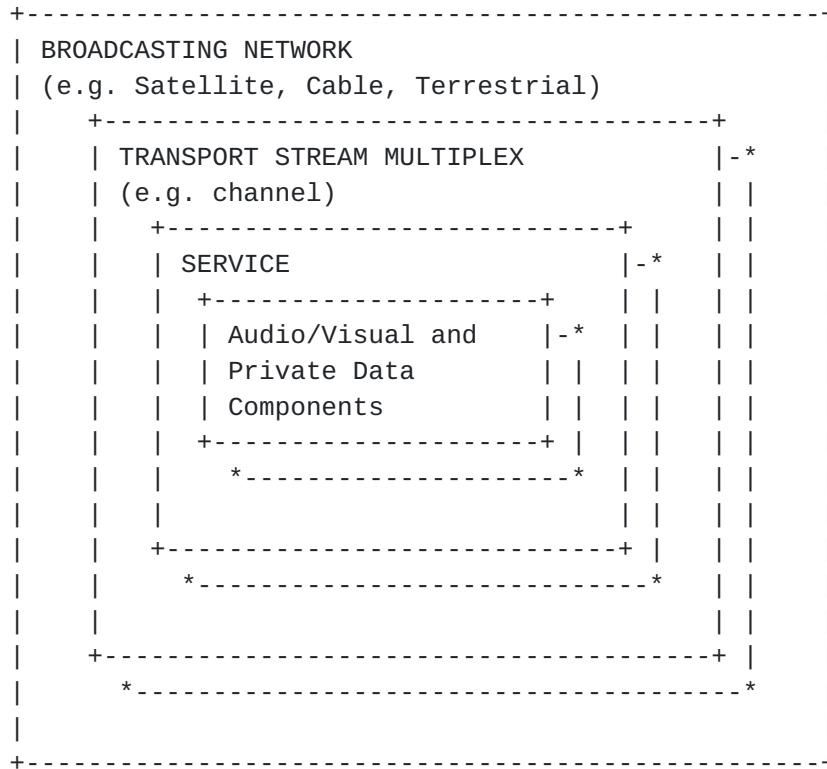
The Digital Video Broadcasting Project (DVB) is an industry-led consortium of over 270 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing global standards for the global delivery of digital television and data services. Services using DVB standards are available on every continent with a total of more than 500 million DVB receivers already deployed. More information on DVB can be found on their website at <http://www.dvb.org>

This URI specification is for a permanent assignment.



1.1. Transmission Scheme

The audio, visual or private data components constituting a TV/radio programme ("service") are defined as elementary stream (ES) components. Several of these TV/radio programmes are bundled in a transport stream (TS) multiplex for delivering over a broadcast transmission network (e.g. satellite, cable or terrestrial). The distinguished unique number for each TS multiplexed packet, elementary stream component, transport stream and transmission network is assigned and transmitted over the satellite, cable or terrestrial broadcasting media, or over an IP network, together with an information table which describesthese assigned numbers, as described by the MPEG-2 standard [MPEG-Systems].



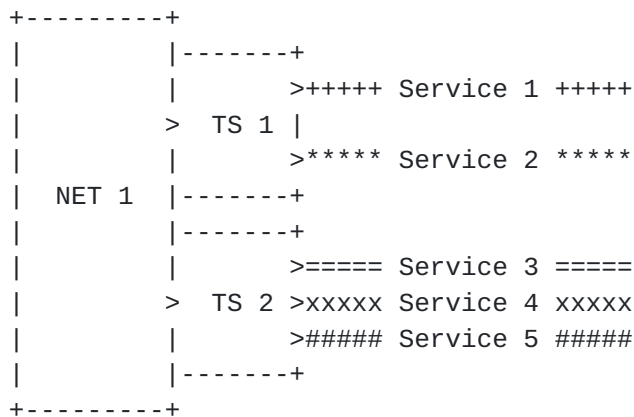
Programme Delivery Scheme in MPEG-2 Transport Stream

These elements are unambiguously identified in DVB systems through numerical identifiers:

- o A \*network\_id\* identifies a broadcast transmission network. On satellite and IP broadband, typically one network\_id corresponds to an operator. On cable and terrestrial, where different radio frequencies might be used in different regions, operators typically use one network\_id per such region.



- o An *original\_network\_id* is used where TV/radio programmes are taken from one network and are re-transmitted on another one (noting that a "network" in this context may simply be a different broadcast region for the same operator). The *original\_network\_id* is therefore used by receivers as a means of determining equivalence across different networks.
- o A *transport\_stream\_id* is used to refer to a time-domain multiplex of several programmes carried in TS packets. One or more multiplexes can be transmitted on any given radio frequency in a DVB network.
- o A *service\_id* identifies a TV, radio or data programme within a TS multiplex. The number of programmes is limited by the capacity of the underlying physical channel.
- o A *component\_tag* identifies an elementary stream (ES) of video, audio, teletext, subtitles, or other data within a service.



Relationship of Network, Transport Stream, and Service

The *original\_network\_id* is an attribute of a transport stream (TS). In the simplest case, all services originate from the network on which they are transmitted. In this case, the *original\_network\_id* of all the TS will be equal to the *network\_id*, and this typically occurs on networks operated by public broadcasters. If one of the public broadcaster's transport streams is, for example, re-transmitted by a cable operator, the information about this stream would contain the cable operator's *network\_id*, and the *original\_network\_id* of the public broadcaster.

Thus, all assigned *network\_id* values must correlate with actual broadcast infrastructure, whereas this is not required for *original\_network\_id* values which have a more logical basis. A





globally active content provider may for example choose to register an `original_network_id`, and distribute pre-multiplexed transport stream to broadcasters, without operating any broadcast network of its own.

The assignment of values for both `original_network_id` and the `network_id` are coordinated by the DVB Project. The DVB Project in turn has delegated the management of DVB identifiers to DVB Services Sarl [[DVB-SVCS](#)]. DVB Services maintains a public register of all assignments, and accepts requests for new assignments on their website.

Due to the way broadcast transmission networks are operated (and, to an extent, the design of MPEG-2), some relationships exist between these identifiers:

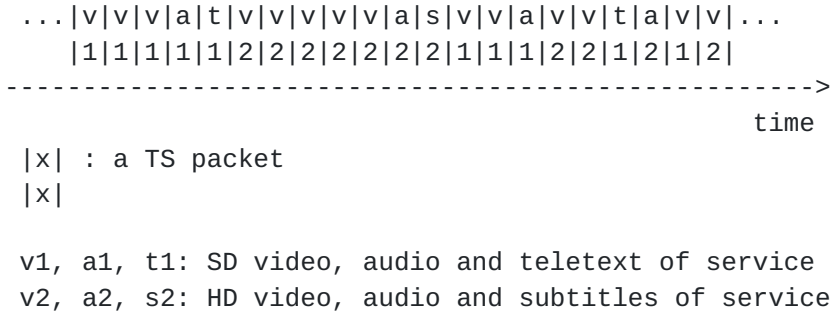
- o Each TS is part of exactly one `original_network_id` (see above).
- o Hence, each TS is unambiguously identified by the tuple `{original_network_id, transport_stream_id}`.
- o According to [[DVB-SI-SPEC](#)], each `service_id` is unique within a TS. Hence a service is unambiguously identified by the tuple `{original_network_id, transport_stream_id, service_id}`.
- o [[DVB-SI-GDL](#)] additionally requires that each `service_id` be unique within an `original_network_id`. Hence, in areas where [[DVB-SI-GDL](#)] has been made part of the broadcast profile, the tuple `{original_network_id, service_id}` unambiguously identifies a service.

During the process of performing a "service scan", a receiver will capture the identifying information contained within the transport streams and store their `transport_stream_id`, `original_network_id` and `network_id`, as well as the `service_id` values of all of the services carried within that transport stream. As each radio frequency channel is scanned, the receiver constructs a table correlating each of these tuples with the radio frequency channels and other modulation parameters, such that when it is required to switch to specific service within a transport stream, it can tune the radio receiver appropriately. Within the context of [[DVB-IPTV](#)], of course, there are no radio frequencies, however the same model of broadcasters, networks and services is maintained and the same identifiers are used with the same semantics.

A DVB service is composed of one or more components. These are identified within the context of a service by their `component_tag`. A component can be either an elementary stream (ES) carrying video,



audio, teletext, subtitles, or other synchronised data or generic data (see also [[DVB-DATA](#)], [[DVB-TVA](#)] and [[DVB-MHP](#)]). Each of these components is sliced into fragments and packetised in TS packets [[MPEG-Systems](#)]. All packets for a given component are labeled with the same TS Packet Identifier (PID), effectively providing a virtual channel within the TS for that component. The packets are time-division multiplexed according to each component's data rate requirements for broadcast.



Example TS time domain multiplex

In the above figure, all TS packets for "v1" would share the same PID value. Similarly, all TS packets for "a2" would also share a different PID value, and so on. The metadata describing the network, transport streams, services, and their components is transmitted within a TS using well-known PID values according to [[MPEG-Systems](#)] and [[DVB-SI-SPEC](#)]. These metadata TS packets are not shown in the above figure for clarity.



## **2. Digital Video Broadcasting URI Scheme**

The DVB URI is defined by [[DVB-URI](#)], and that shall be considered the authoritative source of the definition of the scheme-specific-part of the DVB URI.

URIs employing the `dvb` scheme are URLs. DVB URLs may refer to any of the following kinds of resource:

- o A DVB service
- o Components within a DVB service (such as an audio or video stream)
- o An event (for example, a programme)
- o A transport stream
- o A file contained within a DSM-CC object carousel
- o Interactive applications

### **2.1. Syntax**

This section details the components of the syntax. The syntax also makes use of components defined in [[RFC3986](#)] and [[RFC5234](#)]. These are not reproduced here for brevity. Future revisions of [[DVB-URI](#)] and related specifications may add additional syntax elements or otherwise extend the `dvb` URI scheme to support emerging DVB-based applications.

This URI scheme is in conformance with the generic URI syntax [[RFC3986](#)] and uses the registry-based naming authority version of that. It takes the form:

```
DVB-URI    = dvb-scheme ":" dvb-path
```

```
dvb-scheme = "dvb"
```

```
dvb-path   = ( "//" ( dvb-net-entity [ path-absolute ] ) )  
            / ( "//" dvb-app-entity )  
            / path-absolute
```

When the `dvb-path` part only consists of a `path-absolute`, the URI refers to a file in the default object carousel within the current DVB service. The "current" service is dependent on the usage context.



**2.1.1. dvb-scheme**

The dvb-scheme name represents the transmission system using the MPEG-2 standard in the digital broadcasting service in accordance with [Section 3.1 of \[RFC3986\]](#).

In this definition "dvb" represents the DVB system which is based on [\[BT.1306\]](#), [\[BO.1516\]](#), [\[J.83\]](#), and [\[DVB-IPTV\]](#).

**2.1.2. dvb-net-entity**

A dvb-net-entity uniquely identifies an originator, transport stream, service, event or component within the DVB system, either by way of numeric identifiers or through the use of textual service identifiers (some of which are pre-defined, while others may be advertised within the system). The dvb-net-entity may also refer to a specific DVB carousel, or include a timed event constraint.

The general syntax of the dvb-net-entity is:

```

dvb-net-entity           = transport-stream / service-entity

transport-stream        = original-network-id "." transport-stream-id

service-entity          = dvb-service [ "." component-set [ "$" carousel-
id ]]
                        [ event-constraint ]

dvb-service             = ( original-network-id "." [ transport-stream-id ]
"." service-id )
                        / ( "" textual-service-identifier "" )

original-network-id     = hex-string

transport-stream-id     = hex-string

service-id              = hex-string

textual-service-identifier = reg-name

carousel-id            = hex-string

hex-string              = 1*HEXDIG

```

The dvb-net-entity, if present, may identify one the following:

- o A transport stream (through combination of original\_network\_id and transport\_stream\_id)





- o A service, either through hexadecimal numeric identifiers or through in textual form
- o An audio, visual, or data component within a service
- o A carousel contained within a component of a service
- o An event which occurs within a service

#### **2.1.2.1. component-set**

The component-set referenced in the syntax above is used to identify one or more components of a service and takes the form:

component-set	= component-tag-set / qualified-component-set / fully-qualified-component-set
component-tag-set	= component-tag *( "&" component-tag )
component-tag	= hex-string
qualified-component-set component )	= qualified-component *( "&" qualified- component )
qualified-component	= component-type "=" component-id
component-type	= "video" / "audio" / "data" / "subtitle" / "teletext" / "dvbst"
component-id	= component-tag / iso639-language-code / "default" / "current" / "hearing_impaired" / "visually_impaired" / "none"
fully-qualified-component-set	= fully-qualified-component *( "&" fully-qualified-component )
fully-qualified-component	= "fqc=" stream-content-and-component-type "," component-tag [ "," iso639-language-code ]
stream-content-and-component-type	= hex-string
iso639-language-code	= 3ALPHA



### **2.1.2.2. event-constraint**

An event-constraint identifies an event occurring within a service:

```
event-constraint = ( event-ref [time-constraint] )
                  / time-constraint

event-ref       = ";" [ event-id ] [ ";" tva-id ]

event-id       = hex-string

tva-id        = hex-string

time-constraint = "~" time-duration

time-duration  = start-time "--" duration

start-time     = date "T" time "Z"

duration      = "PT" hours "H" minutes "M" [ seconds "S" ]

date          = year month day

time          = hours minutes [ seconds ]

year          = DIGIT DIGIT DIGIT DIGIT

month         = DIGIT DIGIT

day           = DIGIT DIGIT

hours        = DIGIT DIGIT

minutes      = DIGIT DIGIT

seconds      = DIGIT DIGIT
```

An event may be identified by its event-id, a TV-Anytime tva-id, a start-time and duration according to UTC, or a combination of some or all of the three.

### **2.1.2.3. dvb-app-entity**

A dvb-app-entity is a specific form of DVB entity identifier which is used in interactive applications, and takes the form:



```
dvb-app-entity = ( "current" [ ( ".audio" / ".video" / ".av" ) ] )
                / "original"
                / ( ( "current" / dvb-service ) ".ait/" ait-abs-path )

ait-abs-path   = "app-root" / ait-application

ait-application = org-id-part "." app-id-part [ "?" ait-params ]

ait-params     = "arg_" 1*DIGIT "=" *uric [ "&" ait-params ]

org-id-part    = lowposhex-string

app-id-part    = lowposhex-string

lowposhex-string = lowposhex *lowhex

lowhex        = DIGIT / "a" / "b" / "c" / "d" / "e" / "f"

posdigit      = "1" / "2" / "3" / "4" / "5" / "6" / "7" / "8" / "9"

lowposhex     = posdigit / "a" / "b" / "c" / "d" / "e" / "f"
```

DVB interactive applications are Java Xlets that are carried in the broadcast signal. Terminals extract and then execute these Xlets. They are advertised inside the broadcast signal in the Application Information Table (AIT). The `dvb-app-entity` can thus refer to such application advertisements in its `".ait/"` form. In its other forms, the `dvb-app-entity` refers to a DVB service or components thereof which are used in conjunction with the currently running application. For further information, please see [[DVB-MHP](#)].

## **[2.2.](#) Encoding**

Section 5 of [[DVB-URI](#)] specifies that:

"All characters not within the range of characters allowed in a URI must be encoded into UTF-8 and included in the URI as a sequence of escaped octets. An escaped octet is encoded as a character triplet, consisting of the percent character "%" followed by the two hexadecimal digits representing the octet code."

## **[2.3.](#) Community Considerations**

### **[2.3.1.](#) Context of Use**

The "dvb" URIs are used as references to resources in digital multimedia programmes, most often within the context of DVB itself: interactive television applications use them in order to locate



resources and to reference services and programmes. These are typically broadcast via satellite, cable and terrestrial systems, but may also be retrieved on-demand from a server via the Internet. Providers of such broadcast services may e.g. reference programmes in the broadcast from an Electronic Programme Guide (EPG) which is published on their web- site. On another example, the metadata which is part of the multimedia broadcasts can also contain such URIs to establish hyperlinks between broadcast services. This might for instance include multi-angle video services (e.g. for sports events). Users of suitably-equipped clients -- i.e. with a suitable tuner card and software installed (Open Source tools including <http://www.linuxtv.org/> and <http://www.mythtv.org/>) -- are able to exchange such URIs (e.g. via an instant messaging service or email) to provide each other clickable hyperlinks to multimedia content they deem of interest.

DVB has published specifications for the distribution of multimedia services via IP unicast and multicast mechanisms. In this context, such URIs are usable in any player client software (no tuner card required) that implements the respective protocols and has the relevant audio and video codecs installed.

- o For example, a receiver connected to a local area network might allow other devices to query it for information regarding the current programme or service: in this context, a dvb URI would typically be the most authoritative single identifier which could be used to refer to that programme.
- o Similarly, a web service can be implemented by a platform operator or a broadcaster (or some party working on their behalf) which allows resolution of dvb URIs - this would allow a device to retrieve web pages or other content which relate to the current programme (or some other entry in the device's Electronic Programme Guide).

Implementing such a system naturally requires some mechanism for devices to discover an appropriate resolution service. DVB has developed a service discovery and selection (SD&S) solution as part of [[DVB-IPTV](#)].

### **2.3.2. Resolution Considerations**

The resolution process is determined through the development of DVB standards by the Digital Video Broadcasting Project (DVB).

Since the implementations envisaged cover a wide range of devices with quite different access methods and capabilities, no single resolution or delegation mechanism can be referenced in this





document.

Currently 2 client system classes are covered by DVB specifications:

- o A broadcast set-top box or other receiver which only has a unidirectional, receive-only connection -- for example by way of a UHF radio receiver. Hence, all DVB URIs need to be resolvable from the service discovery information received within the broadcast stream.
- o A "home network end device" (HNED) which could be an IPTV set-top box, networked TV or personal digital recorder with an Ethernet or WLAN connection to a home gateway device.

Further device classes will be addressed as DVB standardisation progresses. The dvb URIs must however remain valid. DVB will define appropriate resolution mechanisms to ensure that DVB URIs remain valid for those new device classes as well.

For the two above example device classes, three mechanisms of conveying such resolution information are currently defined by DVB:

- o Repeated, cyclic transmission of service discovery information as auxiliary data in digital TV broadcast streams over satellite, cable or terrestrial transmissions according to [[DVB-SI-SPEC](#)], [[DVB-DATA](#)] and [[DVB-TVA](#)]. Typically, this information is collated and stored during a "service scan". It can then be looked up at point of resolution, and the receiver may tune to the associated frequency and if demultiplex the appropriate transport stream.
- o Repeated, cyclic multicast transmission of SD&S Records via the DVBSTP protocol according to [[DVB-IPTV](#)].
- o Unicast delivery of SD&S Records in response to HTTP "GET /dvb/sdns" requests according to [[DVB-IPTV](#)].

#### **2.3.2.1. Identifier Management**

For some of the identifiers used in the DVB URI syntax, DVB provides a public registry which is operated by DVB Services Sarl [[DVB-SVCS](#)] and is available on the Web at <http://www.dvbservices.com/>. [1] On that site, the registry tables can be viewed, downloaded, and applications for new identifiers can be submitted. Most of the identifiers not listed in the registry are under the scope of one of the registered identifiers (for example the service\_id is under control of the holder of a network\_id or original\_network\_id). A select few identifiers are not open for registration to the public, and are managed by DVB itself. For details on the nature of each



identifier, please refer to the corresponding DVB standard.

### **2.3.3. Implementation Considerations**

#### **2.3.3.1. Considerations for resolution server software**

With on-going development of DVB standards, DVB will establish requirements and seek candidates for operating resolution servers as appropriate.

To boot-strap the resolution process, a DVB client needs to discover an entry point (or set of) from which to obtain an initial Service Discovery and Selection XML record:

- o By default, the service discovery information is provided on the IANA registered well-known port dvbservdsc (port number 3937) via tcp and udp (see <http://www.iana.org/assignments/port-numbers>) on the IANA registered well-known multicast addresses 224.0.23.14 (DvbServDisc on IPv4) and FF0X:0:0:0:0:0:12D (DvbServDisc on IPv6).
- o As set forth in [\[DVB-IPTV\]](#), a list of non-default Service Discovery and Selection (SD&S) entry points addresses may also be provided via DNS based on the service location resource record (SRV RR) [\[RFC2782\]](#). The service name for DVB services is "\_dvbservdsc", the protocol may be tcp or udp, while the rest of the name is the domain name maintained by DVB for service discovery. This domain name is set to "services.dvb.org". The DVB organization will maintain the services.dvb.org domain name for service discovery and new service providers should register with DVB to add them to the DNS SRV list.

#### **2.3.3.2. Considerations for resolution client software**

To obtain the initial Service Discovery and Selection (SD&S) XML record, a client must by default first join the IANA registered well-known multicast addresses 224.0.23.14 (DvbServDisc on IPv4) and/or FF0X:0:0:0:0:0:12D (DvbServDisc on IPv6) and try to obtain a boot-strap record from the IANA registered well-known port dvbservdsc (port number 3937) via tcp and udp (see <http://www.iana.org/assignments/port-numbers>).

To discover non-default entry points addresses, [\[DVB-IPTV\]](#) defines that a list of Service Discovery and Selection (SD&S) entry points addresses may be acquired via DNS according to the service location resource record (SRV RR) [\[RFC2782\]](#). The service name is "\_dvbservdsc", the protocol may be tcp or udp, whilst the suffix is implementation-defined. A client MAY attempt resolution using



multiple suffixes if required, and MAY employ [[RFC6762](#)] in order to perform resolution.

HTTP servers are advertised through this mechanism using the "tcp" protocol, while multicast addresses are advertised using the "udp" protocol.

SRV RRs will be published for the foreseeable future with the suffix "services.dvb.org" (resulting in the fully-qualified domain names "\_dvbservdsc.\_tcp.services.dvb.org" and "\_dvbservdsc.\_udp.services.dvb.org"). This suffix MAY be used for resolution as a fall-back in the event that resolution using any configuration- or implementation-defined suffixes fails.

#### **2.4. Rights to Use Trademarks**

Conforming to [section 7.4 of \[RFC3978\]](#), the DVB Project who is the holder of various trademark and logo rights amongst others but not limited to the term "dvb", hereby grants IETF a perpetual license to use any such trademarks or service marks solely in exercising its rights to reproduce, publish and modify this IETF contribution. This license does not authorize any IETF participant to use any trademark or service mark in connection with any product or service offering, but only in the context of IETF Documents and discussions.

#### **2.5. Examples**

These examples make heavy use of the identifiers defined by DVB to identify entities. Please see [Section 1](#) for an explanation of the concepts.

##### **2.5.1. Referring to transport streams and services**

In the below examples, a receiver uses the identifiers in the URI to search its internal database of radio frequencies and modulation parameters, which it built during a service scan run. It uses the identifiers as keys to look up in the various tables.

dvb://233a.1041

The DVB transport stream multiplex with id 0x1041 and with original network id 0x233a. This might be used by a broadcaster to provide an entry point to its service offering, without picking out any of his services in particular.

dvb://233a.1041.10bf

The DVB service with id 0x10bf in the DVB transport stream with id 0x1041 and with original network id 0x233a. This could be used as the link behind a "watch this now" button.



dvb://233a..10bf

The DVB service with id 0x10bf and with original network id 0x233a. This could be used as the link behind a "watch this now" button. Note that compared to the previous example the transport stream id is omitted. This is possible in areas where [\[DVB-SI-GDL\]](#) is applicable.

dvb://'MetroTV'

The DVB service named "MetroTV". Note that as opposed to the previous example, the reference to the service's name is not necessarily unambiguous and requires more contextual information to be resolved. For "speaking" or "promotional" URIs, [\[DVB-TVA\]](#) might be a more general alternative.

### **2.5.2. Referring to service components**

In addition to referring to a TV/radio programme as a whole, it might be desirable to be able to pick out specific variations of audio and video provided by a programme. One could for instance always be interested in the video with open signing, or in the audio for the visually impaired.

dvb://233a.1041.10bf.audio=fra

The default video stream and the French language audio stream in the indicated DVB service.

dvb://233a.1041.10bf.audio=qaa&subtitles=eng

The default video stream, the original language audio stream, and the English language subtitle stream in the indicated DVB service.

dvb://233a.1041.10bf.video=default&audio=visually\_impaired The default video stream and the audio stream for the visually impaired in the indicated DVB service.

dvb://233a.1041.10bf.fqc=50B,3&fqc=640,5,fra The HD video stream (stream\_content 0x5 and component\_type 0x0B) with component\_tag 3, and the French language ("fra") HE.AAC audio for the visually impaired (stream\_content 0x6 and component\_type 0x40) with component\_tag 5.

### **2.5.3. References for triggering**

Applications might want to trigger on the start and/or end of TV/radio programmes. The user might e.g. have set a flag on the programme, so that the receiver will remind him when it begins, or might even automatically switch to the respective service when the programme begins, and back to the previous service when it is over. Or a user might have selected a programme for recording. These





scenarios require that an application has some notion of the start and end times of TV/radio programmes.

Creating accurate recordings of broadcast content is a non-trivial task. For a wider discussion of this, please see [\[DVB-TVA\]](#). Although individual service components can be selected for recording, all components of the service should generally be recorded where appropriate. This would for instance enable to use the original language audio instead of the dubbed version on special playback occasions.

`dvb://233a.1004.1044;8fff`

Event with id 0x8fff within the indicated DVB service. A receiver would look up the EPG information for the given service, and for the indicated event within that service. The EPG information will contain the wall-clock start time and duration of the programme as published e.g. also in print. Since the actual times of transmission may be different, triggers should only be fired with appropriate lead-in and lead-out times relative to the published EPG times. Receivers can also use additional information in the EPG, in particular the `running_status`. Not all broadcasters do however manage the `running_status` reliably or in real-time.

`dvb://233a.1004.1044.audio=fra;8fff` French audio version of the event with id 0x8fff within the indicated DVB service. The video would also be implied if it is a TV service. See also previous example.

`dvb://233a.1004.1044;8fff~20100706T000315Z--PT00H31M17S`

Event with id 0x8fff within the indicated DVB service, starting at 00 hours, 03 minutes and 15 seconds UTC on July, 6th, 2010, lasting for 00 hours, 31 minutes and 17 seconds. This form of the URI can be used to convey more accurate transmission times for the content. The programme may be advertised as starting at 00:00 and ending at 00:30 in the EPG. This extended information in the locator can be used to get a much more accurate trigger for the programme. The lead-in and lead-out times can be reduced to the minimum needed to account for the skews of the local and broadcaster clocks.

#### **[2.5.4. Referring to data objects](#)**

[DVB-DATA] defines - among other things - an object carousel which can be mounted as a file system. The data for this object carousel is transmitted repeatedly.



dvb://233a.1041.10bf/doc/form.pdf

File in a subdirectory of an object carousel, for which the root object is carried in the default object carousel of the referenced DVB service.

dvb:/image.png

File in root directory of an object carousel, for which the root object is carried in the default object carousel of the current service.

dvb://233a..10bf.3\$10a1240f/doc/form.pdf

File in a subdirectory of an object carousel, for which the root object has the transaction id 10a1240f and is carried in the ES with component\_tag 3 of the referenced DVB service. Note that compared to the first example the transport stream id is omitted. This is possible in areas where [[DVB-SI-GDL](#)] is applicable.

#### **2.5.5. References used with interactive applications**

[DVB-MHP] defines - among other things - how interactive applications can make use of audiovisual or other multimedia services and service components.

dvb://233a.1041.10bf.ait/1a2f.23b0?arg\_1=Everest&arg\_2=Kilimanjaro

Reference to the application with id 23b0, published by the organisation with id 1a2f, as advertised in the AIT which is transmitted as part of the service identified by 233a.1041.10bf. In case the application were to be launched, it should be passed two arguments; the first argument is "Everest", and the second argument is "Kilimanjaro".

dvb://current

The service currently selected by the Java Xlet via the javax.tv.service.selection package.



### **3. IANA Considerations**

This specification requests the IANA permanently register the "dVB" URI scheme as specified in this document and summarized in the following template, per [[BCP115](#)]:

#### **3.1. DVB Registration Template**

URI scheme name: dVB

Status: Permanent

URI scheme syntax: See [Section 2](#).

URI scheme semantics: See [Section 2](#).

Encoding considerations: Conformance with [RFC3986](#), no special considerations.

Applications/protocols that use this URI scheme name: dVB URIs are used throughout DVB-compliant broadcasting systems, for example within Freeview and Freesat in the United Kingdom. They are also used in TV-Anytime [[TV-Anytime](#)] metadata where it relates to services transmitted by DVB systems.

Interoperability considerations: None.

Security considerations: See [Section 3.2](#).

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### **3.2. Security Considerations**

[Section 7 of \[RFC3986\]](#) describes general security considerations for URI schemes. The sections relating to reliability and consistency, malicious construction, back-end transcoding, rare IP address formats and semantic attacks all apply to dvb URIs. The section relating to sensitive information does not apply, given that dvb URIs do not contain authentication information.

The security considerations of the Digital Video Broadcasting suite of standards in general are not covered in this document.





## **4. References**

### **4.1. Normative References**

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### **4.2. Informative References**

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- [MPEG-Systems] Society of Motion Picture and Television Engineers, "Information technology -- Generic coding of moving pictures and associated audio information: Systems", ISO/IEC 13818-1, December 2000.
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- [DVB-MHP] DVB Project, "Digital Video Broadcasting (DVB); Multimedia Home Platform (MHP) Specification 1.1.1", ETSI TS 102 812, <[http://www.etsi.org/deliver/etsi\\_ts/102800\\_102899/102812/01.02.02\\_60/ts\\_102812v010202p.pdf](http://www.etsi.org/deliver/etsi_ts/102800_102899/102812/01.02.02_60/ts_102812v010202p.pdf)>.
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URIs

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