



# **Commercial Requirements for Targeted Advertising in DVB-I services delivered via DVB-DASH**

**DVB Document C103**

**January 2021**

**DVB<sup>®</sup>**

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## Intellectual Property Rights

Please refer to the IPR policy of DVB Project available at: <https://dvb.org/about/policies-procedures/>

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## Foreword

DVB is an industry-led consortium of broadcasters, manufacturers, network operators, software developers, regulators and others from around the world committed to designing open, interoperable technical specifications for the global delivery of digital media and broadcast services. DVB specifications cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. DVB dominates the digital broadcasting environment with thousands of broadcast services around the world using DVB specifications. There are hundreds of manufacturers offering DVB-compliant equipment. To date, there are over 1 billion DVB receivers shipped worldwide.

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## Executive summary

While these Commercial Requirements were finalized in January 2021, and the technical work that they led to was completed in the meantime, the DVB Steering Board approved their open publication in July 2022, to complement the more recently finalized Commercial Requirements for Verification & Validation of Targeted Advertising in DVB-I services delivered via DVB-DASH (available as DVB BlueBook C104).

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# 1. Introduction

The current DVB Targeted Advertising specifications [7] cover the dynamic substitution of advertising in a linear broadcast. This document sets out use cases and commercial requirements for extending similar functionality to DVB-I services delivered via DASH, in ways that are optimised for and take advantage of the characteristics of broadband IP networks.

## 1.1. Scope

This document identifies the use cases which are applicable to the presentation of targeted advertisements in conjunction with linear audio-visual media programming delivered over broadband networks. Since the overall user experience when watching broadband delivered programming to a television based device is expected to be similar to that with broadcast delivered programming, many of the usage scenarios should be applicable equally and it is anticipated that significant reuse of UNI signalling and server side functions is possible. It should be noted that these use cases are defined generically, and any technical requirements and subsequent specifications defined from them should be implementable equally on both hand-held devices such as mobile phones and tablets and fixed devices such as hybrid television sets or IP set top boxes.

Some of the use cases specified in this document identify commercially preferable deployment scenarios, such as the insertion of advertising in the head-end (server) or in the consumer (client) device. Either of these approaches should not alter the perceived experience, i.e. the presentation of advertisements inserted in the server side should have the same audio-visual experience as those inserted in the client side.

This document is intended to be a complete and self contained set of CRs.

## 1.2. Scenarios on use of DVB-TA with DVB-I

In the following, the functional diagrams – or conceptual reference models – that describe the scope of DVB-TA with DVB-I, i.e. the functional areas in the end-to-end chain or system which shall eventually be covered by a future specification. This section is formulated in broad terms which should be understandable by a general reader.

The various use cases defined in this document are associated with one (or more) scenarios so that the use cases can be described with reference to the functional blocks identified in the associated diagrams. Note that use cases that mention one of the scenarios may be applicable to other scenarios as well.

Some of the functional areas are to be addressed by a specification, some by guidelines and others are out of scope.

Differently from DVB-TA specification where client side with application support was the unique possible way for ad substitution and 4 scenarios were identified based on who performed certain functionalities (see chapter 3 of CM-TA0007r19), in DVB-I TA scenarios we have to take into account ad insertion together with substitution, both server and client side, and in relation to reporting too.

This leads to the 4 following functional diagrams:

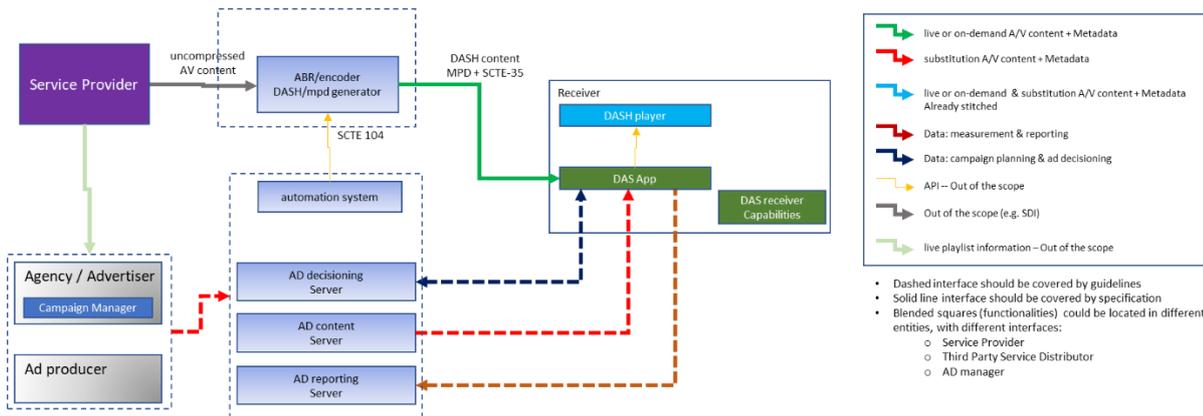
1. Client-side ad substitution/insertion with application support only
2. Server-side ad substitution/insertion without application support and server-side reporting
3. Server-side ad substitution/insertion without application support and client-side reporting
4. Server-Side ad substitution/insertion with application support

In the diagrams, dashed rectangles could represent various entities depending on the depicted functionalities; for instance, the encoder and DASH/MPD generator box could be a third-party service distributor, for example a network operator or a platform operator, and the automation system/ad server box could be a broadcaster or part of a service provider.

The related interfaces, represented by coloured arrows, are explained in the boxes; solid lines will be covered by this specification whereas dotted lines will be covered by guidelines.

### 1.2.1. Client-side ad substitution/insertion with application support only

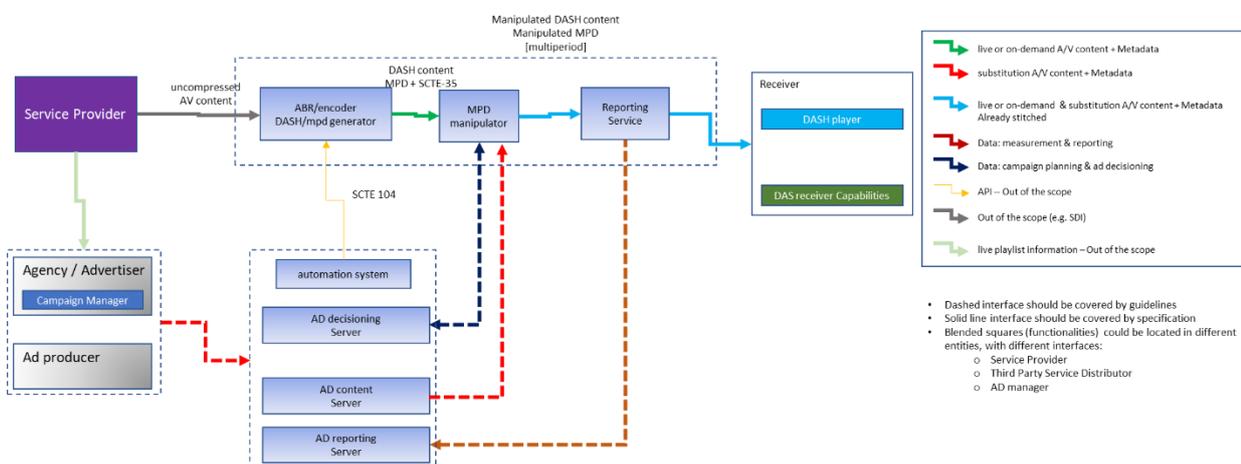
This is very much similar to the DVB-TA scenario where a DAS application is managing the substitution; in DVB-I TA a DAS application is managing the substitution, or the insertion, for example in an on-demand use case, of a personalized ad at a signalled placement opportunity.



### 1.2.2. Server-side ad substitution/insertion without application support and server-side reporting

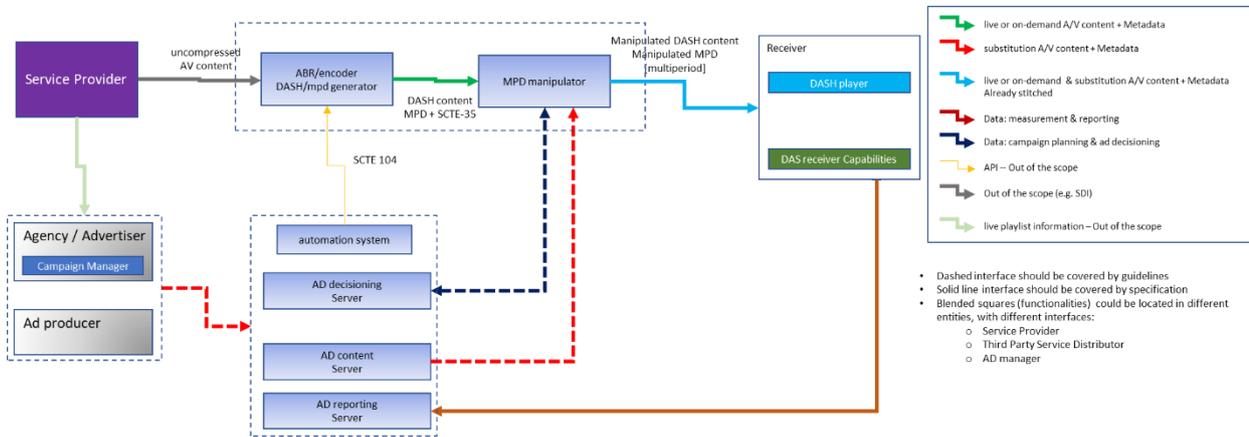
In this diagram the receiver is agnostic with respect to the received streamed content; it plays back what it receives without knowledge of any kind of ad substitution/insertion previously managed server-side. Reporting is managed exclusively server-side.

In this case, reporting is based on insertion of AD content in the MPD which might be different from client-side reporting based on actual view of ads (this may be tolerated by the service provider and the advertisers).



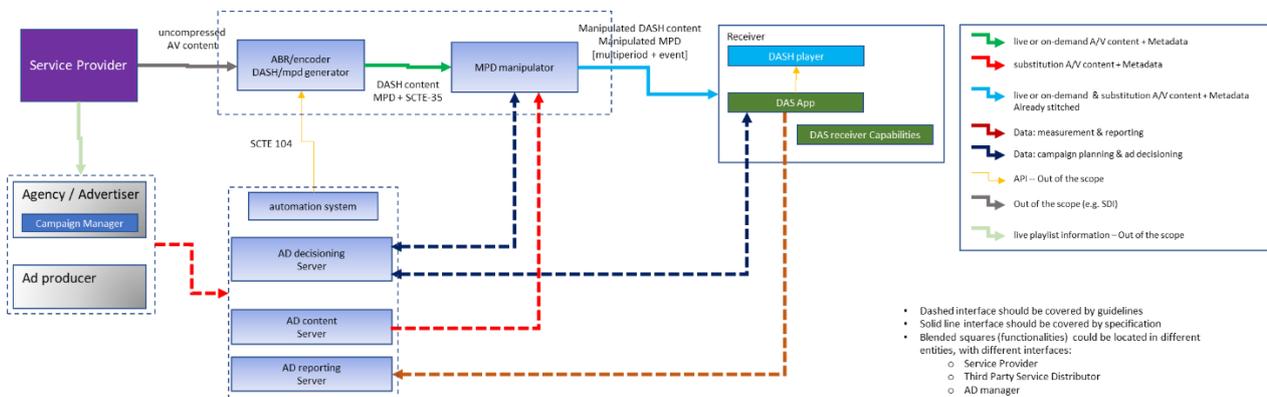
### 1.2.3. Server-side ad substitution/insertion without application support and client-side reporting

Differently from the previous diagram the receiver has some sort of knowledge of substituted/inserted ad and it reports back to the ad reporting server. Reporting could be done by a player SDK.



### 1.2.4. Server-Side ad substitution/insertion with application support

In the last diagram, a DAS application is running on the receiver; it is in charge of providing information to the ad decisioning server in order to create, server-side, the content to be played. Reporting is client-side



## 1.3. External influences

Video content providers face a world where their audience expect to watch content across a wide range of devices. Delivering video content to this fragmented device space is complex whilst maintaining a seamless, broadcast like viewing experience is crucial.

Server-Side Ad Insertion (SSAI) aims to solve this by moving complexities from the client to the server and perform ad insertion in the shape of manifest manipulation before the content arrives to the user. Most

solutions in the market can handle HLS and MPEG DASH streams for live, linear and on-demand content targeting desktop, mobile and connected TV devices.

To achieve frame-accurate ad replacement requires tight integration with encoders or packagers to precondition the content, meaning that slice points at the beginning and end of an ad break fall onto segment boundaries. Ad break specific metadata which is specified in SCTE-35 [5] format is parsed into stream format specific elements. SSAI technologies use the markers to trigger the decisioning of the ad break and pass all relevant metadata to the ad server.

Reporting for video adverts follow mostly the VAST standard by Interactive Advertising Bureau's (IAB). For accurate tracking and user responses (e.g. click-throughs) client-side logic is required, however there are also instances where reporting is happening server-side as part of SSAI component.

## 1.4. Relevant existing work in DVB

Specific key elements of DVB-DASH that are relevant for targeted advertising include the following:

- Multiple Periods
- Xlink
- Events

In DASH, more than one Period needs to be used where codecs change or where profile and level may increase within the same codec (see also section 1.1.1.7 of the DASH-IF ad insertion specification [1]). It should be noted that some player implementations may tear down, rebuild and re-initialise the media pipeline at a Period boundary. This is a process that may take longer than 0.5 seconds and hence multiple Periods should be avoided when not required. One way of avoiding multiple Periods is ensuring adverts match the content, e.g. by transcoding the adverts. DVB-DASH and MPEG-DASH include mechanisms to signal that adjacent Periods are similar enough that tearing down, rebuilding and re-initialising the media pipeline may not be needed. These mechanisms are very similar and the descriptions may be harmonised in the next version of DVB-DASH.

Multiple periods may be used with targeted advertising in a number of ways;

- They may be used to represent the results of a server-side decision on what advert to insert. In this case, the inserted advert(s) would appear as separate Periods. The DASH player would fetch the advert as defined in the MPD.
- Multiple Periods may also be used in B2B interfaces, for example where a pre-existing MPD is manipulated to insert or replace adverts. See Figure 1 "DASH-IF Ad Insertion Architecture" of the DASH-IF ad insertion specification [1] and interface IF-1 defined later in that document.

Xlink is part of MPEG DASH which is partially included in DVB-DASH. It allows a DASH MPD to include references to so-called "remote Periods". These references are resolved and replaced by a "proper" Period either when the MPD is loaded or as the MPD is played. DVB-DASH only includes resolution of remote Periods when the MPD is loaded. Resolution of xlink as an MPD is played has a number of issues. There has been much discussion in MPEG about this over the past year. There may be gaps with xlink as currently specified in DVB-DASH relating to providing ad decision systems with enough client-related information to make a decision.

Events may be used in both client-side and server-side ad insertion or replacement for a number of purposes.

- Providing advance notice of an approaching opportunity to trigger a request to an ad decision server
- Providing notice of exactly when an opportunity starts and ends in order to trigger an ad insertion or replacement
- Reporting during the playback of an advert, at the beginning, the end and in the middle of advert(s)

The DVB-TA specification is primarily about event signalling using the standards defined by SCTE; SCTE-35 for broadcast MPEG-2 transport streams and SCTE-104 for contribution networks.

Neither DVB-DASH nor DVB-TA yet include the SCTE-214 specifications [2] that defines how SCTE-35 event signalling can be used in DASH. It should be noted that events according to SCTE-214 have been found to crash the DVB-DASH player in some HbbTV TV sets. It is hoped that this is due to issues in MPEG that have since been addressed but care is still needed.

## 1.5. Commercial Case for DVB-TA with DVB-I

CM-TA sparked off the Targeted Advertising specification a few years ago; the work was finalized by the TM-IPI and TM-GBS into the DVB-TA technical specification around a year ago.

That work was referring “to the ability to display an individually selected (on a screen by screen basis) TV ad, replacing for instance the normal broadcast TV ad” and the commercial case for DVB-TA specification was clearly described, and agreed, in a previous Study Mission on Targeted Advertising.

It was clearly defined that DVB-TA specification were applicable to client-side substitution only; adverts contained in broadcast content are replaced with targeted substitution ads by a DAS application on the client, so that a continuous video sequence with targeted substitution ads is created.

At that time CM-TA even considered an OTT scenario where DAS is applied in a setting where TV services are provided Over-the-Top (OTT) and DAS may be implemented client-side or server-side.

However, CM-TA was of the opinion that OTT distribution scenario should be excluded from DVB-TA’s scope - except for re-using of signaling placement opportunities when providing signal feeds to OTT platforms.

Now that we have moved forward with DVB-I services delivered via DVB-DASH, on one hand the new distribution platform would provide more opportunity (see the long list of use cases considered in this work) and, on the other hand, there should be possible gaps to offer true interoperable placement opportunity independently of the distribution platform.

Broadcasters and Operators would like to exploit TA in DVB-DASH streaming of their channels and services over IP; here below a non-exhaustive list of commercial considerations:

1. Little or no substantial changes in their head-end; these are based on SCTE family of standards to signal placement opportunities;
2. Use placement opportunities signalling downstream;
3. Achieve compatibility across broadcast, i.e. DVB TS/DVB DASH parity, where ad selection should be the same irrespective of the delivery mechanisms;
4. Due to the DAS app, client-side substitution offers clear advantage in reporting (e.g. tracking and impression counting) in term of accuracy over server-side reporting; nevertheless, improvements in server-side reporting can be beneficial.

Some of the functional areas of the new specification will be addressed by a specification and some others could be covered by guidelines to help Broadcasters and Operators with guidance to best practices.

## 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 referenced document (including any amendments) applies.

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

[1]	DASH-IF	Guidelines for Implementation: DASH-IF Interoperability Points, DASH Industry Forum, <a href="https://dashif.org/docs/DASH-IF-IOP-v4.3.pdf">https://dashif.org/docs/DASH-IF-IOP-v4.3.pdf</a>
[2]	SCTE-DASH	ANSI/SCTE 214-1 2016: “MPEG DASH for IP-Based Cable Services Part 1: MPD Constraints and Extensions”, <a href="https://scte-cms-resource-storage.s3.amazonaws.com/Standards/ANSI_SCTE%20214-1%202016.pdf">https://scte-cms-resource-storage.s3.amazonaws.com/Standards/ANSI_SCTE%20214-1%202016.pdf</a>
[3]	VAST	IAB Digital Video Ad Serving Template (VAST) 4.0 <a href="https://www.iab.com/wp-content/uploads/2016/04/VAST4.0_Updated_April_2016.pdf">https://www.iab.com/wp-content/uploads/2016/04/VAST4.0_Updated_April_2016.pdf</a>
[4]	HbbTV	ETSI TS 102 796 V.1.4.1 <a href="http://www.etsi.org/deliver/etsi_ts/102700_102799/102796/01.04.01_60/ts_102796v010401p.pdf">http://www.etsi.org/deliver/etsi_ts/102700_102799/102796/01.04.01_60/ts_102796v010401p.pdf</a>
[5]	SCTE-35	ANSI/SCTE 35: “Digital Program Insertion Cueing Message for Cable”, <a href="https://scte-cms-resource-storage.s3.amazonaws.com/ANSI_SCTE-35-2019a-1582645390859.pdf">https://scte-cms-resource-storage.s3.amazonaws.com/ANSI_SCTE-35-2019a-1582645390859.pdf</a>
[6]	DVB-DASH	ETSI TS 103 285 V1.3.1: “Digital Video Broadcasting (DVB);MPEG-DASH Profile for Transport of ISO BMFF Based DVB Services over IP Based Networks”, <a href="https://www.etsi.org/deliver/etsi_ts/103200_103299/103285/01.03.01_60/ts_103285v010301p.pdf">https://www.etsi.org/deliver/etsi_ts/103200_103299/103285/01.03.01_60/ts_103285v010301p.pdf</a>
[7]	DVB-TA	ETSI TS 103 752 parts 1 and 2 “Dynamic substitution of content in linear broadcast”, <a href="https://www.etsi.org/deliver/etsi_ts/103700_103799/10375201/01.01.01_60/ts_10375201v010101p.pdf">https://www.etsi.org/deliver/etsi_ts/103700_103799/10375201/01.01.01_60/ts_10375201v010101p.pdf</a>
[8]	SCTE-67	ANSI/SCTE : “Recommended Practice for Digital Program Insertion for Cable”, <a href="https://webstore.ansi.org/preview-pages/SCTE/preview_ANSI_SCTE+67+2017.pdf">https://webstore.ansi.org/preview-pages/SCTE/preview_ANSI_SCTE+67+2017.pdf</a>
[9]	IABID	IAB Guidelines for Identifier for Advertising <a href="https://iabtechlab.com/wp-content/uploads/2018/12/OTT-IFA-guidelines.final_Dec2018.pdf">https://iabtechlab.com/wp-content/uploads/2018/12/OTT-IFA-guidelines.final_Dec2018.pdf</a>
[10]	IABAPPID	IAB guidelines for OTT/CTV Store Assigned App Identification <a href="https://iabtechlab.com/wp-content/uploads/2020/08/IAB-Tech-Lab-OTT-store-assigned-App-Identification-Guidelines-2020.pdf">https://iabtechlab.com/wp-content/uploads/2020/08/IAB-Tech-Lab-OTT-store-assigned-App-Identification-Guidelines-2020.pdf</a>

## 3. Definitions and conventions

### 3.1. General definitions

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

Client-Side Ad Insertion (CSAI)	See section 3.2
Client-Side Ad Substitution (CSAS)	See section 3.2
Dynamic Ad Insertion (DAI)	See section 3.2
Dynamic Ad Substitution (DAS)	See section 3.2
Server-Side Ad Insertion (SSAI)	See section 3.2
Server-Side Ad Substitution (SSAS)	See section 3.2
Preroll	An advert shown before access to content
Midroll	An advert inserted or replaced into the middle of VoD content, or replaced in linear content
Long-form	Content of significant length, comparable in format to a television programme rather than a short advert or trailer
Infomercial	A long-form advertisement
Seamless	See DVB-DASH [6]

### 3.2. Definitions of Dynamic Advertisement Insertion and Substitution (Normative)

- **Dynamic Ad Insertion (DAI)**
  - A targeted ad is inserted before/during/after presenting (live or on-demand) video content, so that in addition to the video content also the targeted ad is seen by viewers.
  - DAI can either be implemented client-side or server-side:
    - **Server-Side Ad Insertion (SSAI)** – DAI is implemented server-side, i.e. video content and targeted ad(s) are combined by a stitching server to one single continuous video stream. The output of the SSAI process is a DVB-DASH compliant manifest and media segments.
    - **Client-Side Ad Insertion (CSAI)** – DAI is implemented client-side, i.e. video content and targeted ad(s) are combined by an application on the client to a continuous video sequence
- **Dynamic Ad Substitution (DAS)**

- A targeted ad substitutes (i.e. replaces) an advert in (live or on-demand) video content, so that instead of the advert initially contained in the video content the targeted substitution ad is seen by viewers.
- DAS can either be implemented client-side or server-side:
  - **Server-Side Ad Substitution (SSAS)** – DAS is implemented server-side, i.e. adverts contained in video content are replaced with targeted substitution ads by a stitching server, so that one single continuous video stream with targeted substitution ads is created. The output of the SSAS process is a DVB-DASH compliant manifest and media segments.
  - **Client-Side Ad Substitution (CSAS)** – DAS is implemented client-side, i.e. adverts contained in video content are replaced with targeted substitution ads by an application on the client, so that a continuous video sequence with targeted substitution ads is created

### 3.3. Conventions

Commercial Requirement tagging scheme:

Req x. [y].z.	Category.[Subcategory].Name.[x]	Status	Priority
<p>Numeric requirement ref.</p> <p>x = section y = subsection(s) z = sequence number</p> <p>This is a unique id within the document that could be used to refer to a requirement within a specific version of this document.</p> <p>Note that this id. is not strictly coupled to the particular requirement, could vary across different versions of this document</p>	<p><b>Alphanumeric requirement id.</b></p> <p>This is a unique id for a given requirement that remains constant over different versions.</p> <p>This id consists of an alphanumeric part that has a meaning to the reader and an optional number to make the id unique.</p>	<p><b>Status</b></p> <p>This status field can have the following states:</p> <p>Draft = work in progress</p> <p>Agreed = agreed within CM-TA and CM-I</p> <p>Accepted = accepted by DVB-CM</p> <p>Pending = deferred to a later version of this document</p>	<p>This field is the associated priority set by the CM to the requirement.</p> <p>1➔ Must have</p> <p>2➔ Recommended to have</p> <p>3➔ Nice to have</p>

In the requirements text we have used the following conventions:

- *Shall*: Mandatory requirement
- *Should*: Highly recommended requirement
- *May*: Desirable but less important requirement
- ⓘ: Explanation or rationale for a requirement (informative)

## 4. Commercial requirements

NOTE: “shall” is used for requirements that are considered as mandatory, “should” for those that are highly recommended, and “may” for desirable but less important characteristics. As always done in DVB, the TM should consider existing (DVB) specifications where appropriate.

Requirements are marked as follows:

<b>C</b>	Applies to Client-side ad insertion / substitution
<b>S</b>	Applies to Server-side ad insertion / substitution
<b>C/S</b>	Applies to both Client-side and Server side ad insertion / substitution

This reflects the understanding of the Commercial Module and is for information only. It is not intended to constrain the Technical Module.

### 4.1. Areas of applicability

Req 4.1.1	Horizontal business models (C/S)	Agreed	1
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The specification shall be applicable to targeted advertising in linear services delivered over IP networks in horizontal business models.

For the avoidance of doubt, this is targeting linear services delivered using DVB-DASH.

Req 4.1.2	Vertical business models (C/S)	Agreed	1
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The specification shall be applicable to targeted advertising in linear services delivered over IP networks in vertical business models.

Req 4.1.3	Service Providers delivering channels to both horizontal and vertical markets (C/S)	Agreed	1
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The specification shall define signalling for Service Providers to deliver the same channel to both horizontal and vertical markets, i.e. the playout to head-end in-band signalling needs to be the same regardless of the deployment scenario.

Req 4.1.4	Client side (C)	Agreed	1
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The specification shall be applicable to any device with a DVB-DASH player that can run a DAS application.

Req 4.1.5	Server side (S)	Agreed	1
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The specification shall be applicable to any device with a DVB-DASH player.

The specification shall also apply to server-side ad insertion and stitching, packagers, encoders and other ad processing entities.

Req 4.1.6	Use of SoME (C)	Agreed	1
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A DVB player implemented in a device with an HDMI output may use SoME. No further consideration is required for DVB-I services in these CRs.

Req 4.1.7	HbbTV Operator Application (C/S)	Agreed	1
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The specification shall be compatible with HbbTV Op-apps, including by enabling the following use cases;

1. DAS application is embedded in the Op App;
2. DAS application is a stand-alone HbbTV application and runs in parallel and without interference with the Op App.

Req 4.1.8	Service Provider Originated Ad Substitution (C)	Agreed	1
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The specification shall only enable DAS operations triggered and controlled by the Service Provider of the DVB-I service (during the viewing of which DAS takes place), or by any approved delegate of the channel.

Req 4.1.9	Third Party Service Distributor-based ad-substitution (C/S)	Agreed	1
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The specification shall support deployment scenarios in which the Service Provider allows a Third Party Service Distributor to substitute ads.

Req 4.1.10	DAS in non-linear broadcast content (C)	Agreed	1
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The DVB-TA specification shall define a signalling format that allows DAS signalling from linear content to be re-used for viewing of that content via non-linear delivery, e.g. catch-up, restart, network PVR and timeshift.

Req 4.1.11	Commercial applicability (C/S)	Agreed	1
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Content providers that plan to use the capabilities of a terminal implementing the specification (including the distinctive identifier) need to be aware that such use may be subject to a (commercial) agreement between the content provider and the manufacturer of the terminal. This may be enforced by the terminal running the DAS app. Server side ad substitution solutions which do not require any capabilities from the terminal to perform the substitution would not be expected to require such agreements.

## 4.2. Timeline Requirements

Req 4.2.1	Date for specification (C/S)	Agreed	1
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The first version of the specification should be completed by Q4/2021, but earlier completion may be possible if DVB-DASH already meets most of the requirements set out in this document.

The above requirement assumes the relevant CRs are completed and approved in the February 2021 meeting of the Commercial Module and the February 2021 meeting of the Steering Board.

### 4.3. System-oriented Requirements

Req 4.3.1	Responsibility for ad insertion and substitution decisions (C/S)	Agreed	1
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Signalling which ads are eligible for Dynamic Ad Insertion and Substitution shall be the responsibility of the Service Provider.

Decisions on which ads to insert shall be the responsibility of the Service Provider.

The Service Provider may delegate either or both of these decisions to one or more third parties such as a Third Party Service Distributor.

Req 4.3.2	Digital ad decision server compatibility (C/S)	Agreed	1
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The specification shall be compatible with the advert decision servers used for digital advertising (e.g. VAST [3]).

① Due to the evolution of ad decisioning standards, this is believed to require the request to the advert decision server and the processing of the response to be done by an interactive application such as HbbTV [4] or some other technology, or in case of server side ad substitution it would be performed by the ad stitcher.

Req 4.3.3	Enabling trade-offs between reach and quality (C)	Agreed	1
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The specification shall enable Service Providers to make trade-offs between the number of users reached by an advert and the quality of the results in at least the following aspects;

- Seamlessness of switching between content and ads and vice-versa
- The extent to which frame accurate ad-insertion and substitution can be achieved

① e.g. some Service Providers may only want to reach users where frame-accurate ad insertion is achieved, others may want to reach the largest possible number of users even if this would mean some users having black frames (or similar) at the transition between content and adverts.

Req 4.3.4	Replacing multiple non-consecutive ads (C/S)	Agreed	1
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The specification shall enable the replacement of a single ad or multiple non-consecutive ads. See use cases 6.2 – 6.16.

Req 4.3.5	Insertion of a preroll ad (C/S)	Agreed	1
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The specification shall also enable the insertion of a single or multiple preroll ads. See use case 6.1 “Preroll Ad(s) for live service selection”.

① ad insertion in the middle of live services (midroll) is not required.

Req 4.3.6	Replacing consecutive ads (C/S)	Agreed	1
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The specification shall enable the replacement of consecutive ads, either part of an ad break or an entire ad break, see use cases 6.2 – 6.16.

Req 4.3.7	Insertion of consecutive ads (C/S)	Agreed	1
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The specification shall also enable the insertion of consecutive ads, either part of an ad break or an entire ad break. See 6.1 Preroll Ad(s) for live service selection.

① ad insertion in the middle live of services (midroll) is not required.

Req 4.3.8	Interactive advert (C/S)	Agreed	1
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The specification shall support interactive ads that provide a call to action to an interactive application when showing an advert.

Req 4.3.9	Re-usability of solution for non-ad use cases (C/S)	Agreed	1
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Substitution of non-ad content shall be enabled by re-using only a relevant subset of the specification without requiring use of elements specific to ads.

Req 4.3.10	Extensibility (C/S)	Agreed	1
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The signalling and data structures in the specification shall be extensible. It shall allow Service Provider and market specific extensions. E.g. including provision for extending XML elements and attributes.

Req 4.3.11	Transport stream to DVB-DASH and ISOBMFF conversion (C/S)	Agreed	1
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The specification should include guidelines on converting signalling in MPEG-2 TS to DVB-DASH based signalling. This is important because many backends still use MPEG-2 TS and signalling may originate from MPEG-2 TS.

Examples of areas to be covered could include:

- Guidelines on carriage of splice signalling in ISOBMFF segments as used by DVB-DASH.
- Guidelines on carriage of splice signalling in MPD as used by DVB-DASH.
- Guidelines on timing behaviour (e.g. pre-announcement) and conversion from MPEG-2 TS to DVB-DASH.
- Guidelines on id matching and segmentation of MPD and ISOBMFF content.
- Guidelines on storage of signalling in ISOBMFF and MPD.
- Guidelines on signalling in MPEG-2 TS that does not apply to DVB-DASH.

## 4.4. Signalling-oriented Requirements

See also Req 4.7.2, Req 4.7.3 under “Trust and security requirements”.

Req 4.4.1	Pre-announcement of placement opportunities (C/S)	Agreed	1
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The signalling shall allow the pre-announcement of placement opportunities sufficiently far in advance to allow the decision to be made about what ad to insert and for DAS to be performed.

① Constructing a VAST [3] request, sending it to a server, waiting for the response, processing it, determining which ad to play and preloading that ad will take time.

Req 4.4.2	Signalling of placement opportunity (C)	Agreed	1
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The signalling shall allow the signalling of a placement opportunity with sufficient precision to enable frame accurate insertion of the advert on receivers supporting that and where enough of the advert is preloaded.

Req 4.4.3	Ad substitution: No-trick play (C/S)	Agreed	1
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The specification shall support trick-play restrictions for substitute ads that are the same as the broadcast that has been substituted.

Req 4.4.4	Misuse of DVB-TA signalling (C/S)	Agreed	1
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The specification should be suitably resistant to a receiver implementer misusing the signalling to engineer a solution to bypass commercial breaks as a product feature.

① See Req 4.7.2 for encryption of DAS signalling.

Req 4.4.5	Extend duration of ad break (C/S)	Agreed	1
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The specification shall support signalling to extend the planned duration of an ad break.

This signalling may include head end or upstream signalling that is not propagated to the client.

Req 4.4.6	Early termination of ad break (C/S)	Agreed	1
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The specification shall support signalling to terminate an ad break earlier than planned. This may happen:

- at the boundary between advertisements
- during an advertisement

This signalling may include head end or upstream signalling that is not propagated to the client.

Req 4.4.7	Client support for early termination and extensions of ad breaks (C)	Agreed	1
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The specification shall address client support for extended and early terminated ad breaks, including transitions from ad to main and main to ad that is either extended or terminated early.

Req 4.4.8	Device Identification for Server-Side and Client-Side Ad Substitution (C/S)	Agreed	1
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The specification shall enable the Service Provider to reliably identify a receiver in order to enable targeting of adverts as well as to control the ad frequency in general and user-friendly DAS in particular in a privacy-safe and robust way by the use of distinctive identifiers. Existing solutions for identifiers for advertising on OTT platforms should be reviewed to assess compatibility.

Description:

- A user wants to initialise a live stream
- DAS app can request to read distinctive identifier from terminal
- Terminal honours user privacy setting
- If allowed, the distinctive identifier is passed as part of the stream request (in a safe manner e.g. by using https) for later ad decisioning

Note: HbbTV Specification 2.0.2 [4], section 12.1.5 (Distinctive identifier) and IAB Guidelines for Identifier for Advertising provide a possible basis for the specification.

Targeting shall be possible with respect to Service Provider-defined target groups and in all cases shall be in accordance with all applicable regulatory obligations including the EU GDPR, i.e. a receiver should provide an opt-in/opt-out management to the users. Also, the user can reset the distinctive identifier. When an authorised third party is responsible for ad insertion decisions on behalf of a Service Provider, the above mentioned shall apply accordingly to that entity.

① Algorithms for profiling (i.e. matching of devices to target groups) are out of scope of a DVB TA solution.

① In some vertical deployments scenarios the target groups could be defined by either Service Provider or the Third Party Service Distributor.

Req 4.4.9	App identification for Server-Side and Client-Side Ad Substitution (C/S)	Agreed	1
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The specification shall enable the Service Provider to reliably identify the DVB-I client.

DVB-I client names should be unique and consistent, so that the environment can be used for targeting purposes. Existing solutions for identifying applications for advertising on OTT platforms should be reviewed to achieve compatibility.

Description:

- A user wants to initialise a live stream
- DAS app can identify the DVB-I client
- The DVB-I client name can be passed as part of the stream request (in a safe manner e.g. by using https) for later ad decisioning

Note: The IAB guidelines for OTT/CTV Store Assigned App Identification provides a possible basis for the specification. HbbTV Specification 2.0.2 [4], section 7.3.2.4 HTTP User-Agent header also provides a basis for a solution.

Req 4.4.13	Cancellation of an ad break (C/S)	Agreed	1
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The specification shall support signalling to cancel a previously pre-announced ad break before it starts (including where the scheduled start time of an ad break has been passed and the Service Provider determines that the ad break will not take place). This may happen in some occasions in case scheduling has changed or other factors.

This signalling may include head end or upstream signalling that is not propagated to the client.

Guidelines of when cancellation is and is not possible shall be defined.

Req 4.4.13	Manifest Manipulation (C/S)	Agreed	1
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Ideally ad insertion technologies work by manipulating the manifest. Manipulating a multi-period manifest for ad insertion is common. Single period manifest are still popular, and often need to be preserved for compatibility reasons.

For the signalling introduced in DVB-DASH, manifest manipulation options should be enabled such as:

- Conversion from a single-period to multi-period DVB-DASH manifest
- Conversion to alternative manifest formats
- Replacing periods in a multi-period manifest with ad content
- Enabling preserving or removing the splice signalling in the manifest

Guidelines should be included to facilitate some of these conversions and aspects in content authoring guidelines.

Existing terminal guidelines [DVB-DASH] should be reviewed. Such as:

- Single period MPD playback with ad insertion opportunities
- Multi-period MPD playback with ad insertion opportunities
- Playback of multi-period content with replaced periods
- Playback of content with or without ad signalling

While such considerations may be transparent to terminal, these should be reviewed.

## 4.5. Content-oriented requirements

Req 4.5.1	Adverts – broadband (C/S)	Agreed	1
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The specification shall enable delivery of adverts via HTTP and HTTPS using 1) DVB-DASH [6], 2) non-adaptive streaming and 3) simple downloading of the entire ad into memory in advance (subject to there being sufficient memory available for this purpose and to limitations on available memory).

① Non-adaptive streaming could be relevant for client side ad substitution in linear TV use cases.

Req 4.5.2	Returning from ads to linear video (C/S)	Agreed	1
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The specification shall include guidelines on how Service Providers should encode video and audio at the end of an ad replacement spot to optimise the return from ads back to video and audio on receivers that do not support simultaneous decoding of two video and two audio streams.

Req 4.5.3	Linear video and audio content (C/S)	Agreed	1
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The specification shall be applicable to any kind of linear video (SD, HD, UHD, HDR, HFR) and to any kind of linear audio (stereo, multi-channel, NGA).

Req 4.5.4	Ad video and audio content (C)	Agreed	1
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The specification shall be applicable to any kind of ad video (SD, HD, UHD, HDR, HFR) and to any kind of ad audio (stereo, multi-channel, NGA).

① It is not intended to require support for UHD, HDR, HFR and NGA via non-adaptive streaming.

① This does not imply a requirement to support legacy codecs for ads which are not supported by DVB-DASH (e.g. MPEG-2 video, AC-3 and MPEG-1 layer II audio).

Req 4.5.5	Alignment of technical characteristics of DAS advert with linear content characteristics (1) (C)	Agreed	1
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The specification shall support limiting the substitution of ads to those with identical or similar coding, channels and bitrate settings as the linear content, to assure correct technical operation and prevent significant changes in quality when ad substitutions occur.

① For an HD channel an ad should be substituted with an HD ad. On a 4K-HDR channel an 4K-HDR ad should be placed. Bitrates should be similar E.g. the terminal should not suddenly need to retrieve content which a much higher bitrate.

Req 4.5.6	Alignment of technical characteristics of DAS advert with linear content characteristics (2) (C)	Agreed	1
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The specification shall support not limiting the substitution as defined in Req 4.5.5.

Req 4.5.7	Encoding and packaging of video and audio in ads (C)	Agreed	1
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The specification shall address how to encode substitution ads. It shall also consider the aspects listed in 4.6.9.

Req 4.5.8	Preventing inappropriate ad substitutions (C/S)	Agreed	1
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The specification should enable the ad decisioning process to be provided with information from the DAS application to prevent inappropriate substitutions. While many inappropriate substitutions would be prevented by organisational procedures, the possibility to provide information from the terminal to the ad decisioning server should be included.

① For example: presence or absence of subtitles, user language preference, age restrictions, etc.

Req 4.5.9	Accessibility (C/S)	Agreed	1
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The specification shall support ad-substitution in which the substituted ad provides the same accessibility features as the linear content. This may be a regulatory requirement in some countries.

① For example: Spoken subtitling, graphical subtitling and audio description

Req 4.5.10	Loudness levels of main content and ads (C/S)	Agreed	1
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The specification shall allow linear content with replaced ad content to adhere to loudness regulations.

① This is normally met by operational procedures

## 4.6. Receiver-Oriented Requirements

Req 4.6.1	Receiving pre-announcements (1) (C)	Agreed	1
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Receivers shall be able to receive and pass to the DAS application the signalling that pre-announces a location where an ad could be inserted (Req 4.4.1).

Req 4.6.2	Receiving pre-announcements (2) – while playing ad (C)	Agreed	1
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Receivers shall be able to receive signalling relating to one advert while playing a previously replaced advert.

Req 4.6.3	Advert decision process (C)	Agreed	1
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DAS applications shall be able to query an ad decision server in order to find out if an advert can be replaced and what the replacement should be. This may include sending a request to a VAST [3] server.

① It is assumed that this is part of an HbbTV [4] or other application. There is no expectation that horizontal market receivers support VAST natively.

Req 4.6.4	Preloading adverts (C)	Agreed	1
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All receivers shall be able to preload at least one ad into RAM and play ads from RAM without any further network access.

The specification should define a minimum amount of RAM for preloading.

Req 4.6.5	Preloading adverts – not interfering with linear video and audio presentation (C)	Agreed	1
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Linear video and audio presentation shall not be disturbed by preloading ads as defined in Req 4.6.4.

Req 4.6.6	Preloading adverts – not interfering with ad video and audio presentation (C)	Agreed	1
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Where several consecutive ads are being replaced, presentation of the video and audio of one ad shall not be disturbed by preloading the video and audio of the next ad.

It is not expected that receivers will be able to prepare one streamed ad while another streamed ad is playing.

Req 4.6.7	Options for transitions from content to adverts and back again (C/S)	Agreed	1
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The specification shall support receivers that:

- cannot achieve a seamless transition between linear content and ads (and vice-versa);
- can achieve a seamless transition with restrictions (e.g. same codec, same subtitle encoding, same encryption); and
- can achieve a seamless transition even when codecs differ.

The specification shall be implementable on receivers that can achieve a frame-accurate transition from broadcast to adverts (and vice-versa) and those where the timing of the transition is a best effort or approximate.

① Some receivers may insert one or more black or repeated frames and silence.

① Receivers would be able to achieve a seamless transition when codecs differ if they are capable of simultaneously decoding two video streams. Specifically decoding and presenting the video and audio of an ad simultaneously with decoding the broadcast video without presenting it.

Req 4.6.8	Querying receiver capabilities regarding seamless transitions (C)	Agreed	1
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The DAS application should be able to query the receiver to obtain information about the extent of a receiver's support for seamless transitions.

Req 4.6.9	Content transitions (C)	Agreed	1
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The Technical Module is requested to provide content authoring and receiver behaviour requirements and best practices for content transitions, taking into account requirements 4.6.7 and 4.6.8.

Examples of changes to content that should be considered include:

- Allowed Codec changes
- Added / removed representations
- Changed /removed languages
- Timeline gaps/discontinuity in the transition , including size of the gap
- Added/removed adaptation sets
- Changing/constant track roles
- Changing/constant aspect ratios/colour space
- Guidelines for handling programme metadata in the targeted ad
- Transition requirements for both VoD and Live content should be specified, as their behaviour might be different
- Compatibility with legacy and other devices (e.g. HLS)
- Transition between encrypted and non-encrypted content
- Transition between timed text representations and related timeline issues
- A stream is converted from a live (dynamic stream) to a static (VoD) stream

① Note that Req 4.3.3 requires that Service Providers have the ability to trade-off quality of experience and the number of receivers reached.

Req 4.6.10	Reporting – client side (C/S)	Agreed	1
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Client side reporting shall be the responsibility of the DAS application (see section 1.2.3).

① Examples of the necessary data include how much of the ad has been played and the audio volume. In the case of HbbTV, these are provided by the HTML5 media element.

Req 4.6.11	Performance guidelines (C/S)	Agreed	1
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The specification should include guidelines for aspects of receiver performance that are critical to the user experience and to the delivery of the business proposition. Examples include;

Switching from decoding linear content to ad content and vice-versa in devices that cannot simultaneously decode two video streams

Determining the percentage of the advert that has been played with sufficient accuracy to meet reporting requirements (e.g. from VAST)

Notification of when the last video and audio of an advert have been played (so that reporting that an ad has been played 100% can be guaranteed to be accurate).

Req 4.6.12	Capability detection (C)	Agreed	1
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The specification shall enable the DAS App to determine receiver capabilities that affect the achievable user experience. Example include capability for simultaneous or seamlessly spliced decoding and its impact on switching performance (see requirements 4.6.7 and 4.6.11).

Req 4.6.13	Mid-way join (C/S)	Agreed	1
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The specification shall support DAS for long-form ads (e.g. infomercials) that can be joined mid-way through, when the signalling can support this.

① For example: TEMI timeline signalling can be used by an HbbTV application to calculate the time index since the start of the Ad substitution and use this to set the starting playback position within a DASH stream.

Req 4.6.14	Streamed - Not fully pre-loaded (C)	Agreed	1
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The specification shall support DAS where an ad is streamed and there is insufficient RAM in the receiver to fully pre-load it.

## 4.7. Trust and Security Requirements

Req 4.7.1	Encrypted TV channels (C/S)	Agreed	1
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The solution shall support DAS on encrypted TV channels.

Req 4.7.2	Protection of signalling information (C/S)	Agreed	1
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It should be possible to protect the signalling (e.g. by encryption).

① Some Service Providers require the signalling not to be sent in the clear to a receiver, as people may use this information to strip ads. This is a concern for non-linear viewing of linear content.

Req 4.7.3	Signalling – authentication (C/S)	Agreed	1
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It shall be possible for the DAS App to authenticate the signalling.

The chosen authentication process shall be suitably robust against tampering with the process itself and potential misuse of signalling data.

Req 4.7.4	Encryption (C/S)	Agreed	1
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For server side ad insertion/substitution, the specification shall allow for unencrypted delivery of adverts, while the live stream of the linear TV service is encrypted.

For server side ad insertion/substitution, the specification shall allow for encrypted delivery of adverts such that, from the point of view of the receiver, the encryption is continuous between the content and the ad.

For client side ad insertion/substitution, encrypted delivery of advertisements to the receiver is not required.

① There is no requirement for playback of encrypted ads that have been preloaded (see requirement 4.6.4).

Req 4.7.5	Reciprocal DAS Application-Receiver Identification (C/S)	Agreed	1
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The specification shall (i) enable the provider of the DAS application to reliably and securely identify the model of the receiver on which a DAS application is running and (ii) vice-versa, the receiver shall be able to reliably and securely identify the provider of a running DAS application (or determine that the running DAS application is reliably associated with an identified umbrella Service Provider).

Note on usage of the identification function:

How this information is used (or not) by either party is outside the scope of the specification.

Req 4.7.6	Identifying a particular receiver (C/S)	Agreed	1
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The specification shall enable the Service Provider to reliably and persistently store information on receivers in order to enable the delivery of targeted adverts. Across a Service Provider's own bouquet, targeting shall be possible with respect to Service Provider-defined target groups and in all cases shall be in accordance with all applicable regulatory obligations including the EU GDPR.

When an authorized third party is responsible for ad insertion decisions on behalf of a Service Provider (please see Req 4.3.1) the above mentioned shall apply accordingly to that entity.

① Algorithms for profiling (i.e. matching of devices to target groups) are out of scope of a DVB TA solution.

① Defining a method/mechanism that allows the DAS App to store information in non-volatile-memory and to reliably control the lifecycle of the stored data is a potential approach. Thereby, such method/mechanism shall e.g. allow to comply with "the right of erasure" as defined by GDPR.

① In some vertical deployments scenarios the target groups could be defined by either Service Provider or the Third Party Service Distributor.

Req 4.7.7	Securely trusting the substituted content (C/S)	Agreed	1
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The specification shall ensure that Service Providers, manufacturers and Third Party Service Distributors can trust that any substituted ad content is authorised by the DAS application provider.

## 4.8. General Requirements

Req 4.8.1	Alignment with Targeted Advertising Industry Practices (C/S)	Agreed	1
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Industry guidelines exist in the form of DASH-IF Interoperability Points (IOP). Technical proposals should be consistent with the architecture described in the DASH-IF IOP specification v4.3.

The specification should align with the DVB-TA specification [7], SCTE-67 [8] and IAB specifications [9] [10] where appropriate.

Req 4.8.2	SSAx/CSAx conflict management (C/S)	Agreed	1
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The technical solution shall provide a means for Service Providers to avoid potential conflicts between server-side inserted/substituted adverts and adverts, which can be both client-side inserted/substituted and non-manipulated adverts.

① Service Providers need to be enabled to manage potential conflicts for example when a pre-roll ad is to be inserted client-side after a channel change where for the selected channel another ad has already been inserted/substituted server side, as depicted in “Preroll Ads for live service selection” use case (see 3.1)

① client-side insertion/substitution is applicable only via the presence of a running DAI/DAS application. For TV sets this could be an HbbTV application (see definitions in 1.2.2), in this case Service Providers require control of viewer experience in SSAx/CSAx conflicting use cases to be manageable between channels from the same Service Provider only, i.e. on the same Service Provider context. For PC/mobile where an application could manage channels from different Service Providers; it is expected the same possibility of controlling the user experience to avoid conflicts on landing channel.

① In vertical market deployments, Third Party Service Distributors’ support may be needed for controlling the user experience and/or Third Party Service Distributors may manage (parts of) the ad-serving process on behalf of Service Providers.

## 4.9. Reporting

Req 4.9.1	Signalling for client-side Reporting using a DAS app with server-side ad insertion and substitution (S)	Agreed	1
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The specification shall specify signalling for Impression/Tracking information within the media (e.g. in the manifest) such that a DAS app can generate Impression/Tracking events (GET requests to specific URLs) with URL data and request timing as defined by the signalling. A client implementation may include an API so that the client manufacturer can enable or disable the reporting according to commercial agreements.

Note: DASH-IF IOP CR v4.3 for Advanced Ad Insertion in DASH, section 1.2.8.2. “DASH Callback Event” provides a possible basis for the specification.

Req 4.9.2	Viewer responses in server-side ad insertion and substitution via a DAS app (S)	Agreed	1
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The specification shall support viewer responses in server-side advert insertion and substitution where the viewer response either relates to the advert as a whole, specific points in time in the advert or relates to specific areas presented in the video frames. The specification shall define how response resources (URLs) and image-mapping data for specific objects are signalled in the manifest. The specification shall provide recommendations on how the response resources are actioned by the client device using a DAS app.

① When an advert is presented, the viewer should be able to respond to the advert to register interest or learn more about the advertised product. On desktop and mobile devices, viewer response is typically achieved by support of a 'click-through' action whereby tapping or clicking the advert directs the user to an advertiser's website.

For server-side advert insertion and substitution, information for a viewer response mechanism can be signalled in the stream manifest. In addition to a 'click-through' destination for the whole advert, the signalling could describe temporal variations in response (the 'click-through' destination changes throughout the duration of the advert) and/or geometric variations in response (the presented advert is visually divided into regions, each with a separate 'click-through' destination).

Req 4.9.3	Deterministic Impression/Tracking in server-side ad insertion and substitution (S)	Agreed	1
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The specification shall provide guidelines so that server-side tracking and impression counts for server-side advert insertion and substitution are consistent across implementations. The guidelines may include draft timings for signalling and constraints applied to playback.

① When an advert is made available in a streaming manifest, it is not possible for the manifest generator to determine when the advert is presented to the viewer. This uncertainty leads to variation and inaccuracy where server-side tracking is used to record delivery data.

## 4.10. Privacy Requirements

Req 4.10.1	Not relying on communication of personal data (C/S)	Agreed	1
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The specification should allow for some types of operation (e.g. regional advertising, non-targeted replacement of expired adverts in non-linear playback, initiation of technical dialogs) to be executed without the need for communicating personal data (as defined by the GDPR) from the receiver to a Service Provider, with the exception of the IP address that is necessarily transmitted. Retained IP address data shall be processed in compliance with the GDPR.

Req 4.10.2	Privacy and data protection (C/S)	Agreed	1
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The specification shall be developed with the view that the main privacy and data protection responsibilities shall be assumed by the Service Provider and/or Third Party Service Distributor. E.g. that it does not result in the receiver manufacturer being a GDPR controller.

① It is advised that the Service Provider and/or Third Party Service Distributor should inform the consumer about the impact of enabling a TA service – e.g. the time at which the Service Provider and/or Third Party Service Distributor obtain consent from the consumer. This should include but not be limited to explaining

about bandwidth usage, offer options for data capping and offer blocking out for peak periods – This is needed for a non-tech consumer or one who has some data constraints.

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## 5. Items for consideration by other organisations

No specific items were identified for consideration by other organisations. However, this document may be shared to foster co-operation and co-ordination of work across various industry bodies.

## 6. Annex: Use cases (informative)

### 6.1. Preroll Ads for live service selection

<b>Title</b>	Preroll Ad(s) for live service selection  “One or more Ads are played when the user selects a linear TV channel”
<b>Context &amp; Constraints</b>	Several different methods of service selection exist and the presentation of a pre-roll Ad may be applicable to only a few of them <ul style="list-style-type: none"> <li>a. The user selects the service from an EPG (program guide) or other channel list</li> <li>b. The service is selected through the use of the P+/P- buttons on the remote control</li> <li>c. The user manually enters the channel number of the service through their remote control or by some other handheld mechanism (companion screen)</li> </ul> <p>In method a and method c it may be applicable to immediately present a preroll Ad, however in method b there may be some additional handling to ensure meaningful impression and user experience</p>
<b>Description (story)</b>	(Preroll-immediate) When the user selects a service either by entering the channel number or by making selection from a program guide or list, an advertisement is played prior to the live edge of the program being presented. There may be some interaction enabled to allow early termination of the Ad or blocking of certain features until the Ad is played in full.  (Preroll-delayed) In order to provide a user experience that meets the needs of advertising supported linear a delay may be applied to the playout of the Ad when a service is selected through a scanning process, for example use of P+/P- remote control buttons. Only once the user “settles” on services, for example after 3-5 seconds, a delayed preroll Ad can be played.  (Preroll-split) as an alternative to a full screen presentation of the advertisement, a split-screen or PiP mode is used to immediately present an advertisement when the P+/P-. In such cases, the audio would be presented from the advertisement
<b>Business issue (if any)</b>	Playback controls may be placed to ensure that minimum durations of advertisements are presented to the user.  The preroll advertisement could be a still image presented for a defined duration of an AV media stream.
<b>Activities for “CM-TA”</b>	

## 6.2. Server-side Ad Substitution with Client-side Reporting/Tracking by a DAS app

<b>Title</b>	Server-side Ad Substitution with Client-side Reporting/Tracking by a DAS app
<b>Context &amp; Constraints</b>	<p>A standardised mechanism to define signalling Reporting/Tracking information is helpful to the DASH TA ecosystem. The Reporting/Tracking signalling from a DAS app is informed by appropriate signalling in the media (e.g. in MPD).</p> <p>The context is SSAS in which the VAST ad decision response is processed server-side.</p>
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a live stream (encrypted or unencrypted) of a linear TV service, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts are shown to the viewer</li> <li>• The substitution process is carried-out server-side by a stitching-server which also provides data in the media (e.g. in MPD) for tracking &amp; impression URLs and the appropriate timing for them to be hit.</li> </ul>
<b>Business issue (if any)</b>	<ul style="list-style-type: none"> <li>• The solution needs to have an API that the client manufacturer can enable or disable according to commercial agreements.</li> </ul>
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Payout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Specification of signalling to the client tracking/impression URLs and their timing in the media (e.g. in MPD). DASH-IF IOP CR v4.3 for Advanced Ad Insertion in DASH, section 1.2.8.2. “DASH Callback Event” provides a possible basis for the specification.</li> <li>• Terminal requirements to be addressed</li> </ul>

### 6.3. Server-side Ad Substitution

<b>Title</b>	Server-side Ad Substitution
<b>Context &amp; Constraints</b>	
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a live stream of a linear TV service, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts are shown to the viewer</li> <li>• The substitution process is carried-out server-side by a stitching server, which also sends ad requests and reports tracking events (per session and per unique device) to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Payout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Guidance on communication between stitching server and ad server to be given</li> <li>• Terminal requirements to be addressed</li> </ul>

## 6.4. Server-side Ad Substitution (unencrypted ads, encrypted live stream)

<b>Title</b>	<b>Server-side Ad Substitution (unencrypted ads, encrypted live stream)</b>
<b>Context &amp; Constraints</b>	
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted live stream of a linear TV service, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts (which are not encrypted) are shown to the viewer</li> <li>• The substitution process is carried-out server-side by a stitching server, which also sends ad requests and reports tracking events (per session and per unique device) to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Payout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Guidance on communication between stitching server and ad server to be given</li> <li>• Terminal requirements to be addressed</li> </ul>

## 6.5. Server-side Ad Substitution (encrypted ads, encrypted live stream)

<b>Title</b>	<b>Server-side Ad Substitution (encrypted ads, encrypted live stream)</b>
<b>Context &amp; Constraints</b>	
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted live stream of a linear TV service, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts (which are also encrypted) are shown to the viewer</li> <li>• The substitution process is carried-out server-side by a stitching server, which also sends ad requests and reports tracking events (per session and per unique device) to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Playout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Guidance on communication between stitching server and ad server to be given</li> <li>• Terminal requirements to be addressed</li> </ul>

## 6.6. Server-side Ad Substitution with client-side tracking by a DAS app

<b>Title</b>	Server-side Ad Substitution with client-side tracking by a DAS app
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a live stream of a linear TV service, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts are shown to the viewer</li> <li>• The substitution process is carried-out server-side by a stitching-server but a broadcast-related application sends ad requests and/or reports tracking events to an ad server (RRA: request and reporting application)</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Playout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Means for scheduling ad requests client-side to be addressed/specified</li> <li>• Communication between RRA and stitching server to be addressed/specified</li> <li>• Terminal requirements to be addressed</li> </ul>

## 6.7. Server-side Ad Substitution with client-side tracking by a DAS app (unencrypted ads, encrypted live stream)

<b>Title</b>	<b>Server-side Ad Substitution with client-side tracking by a DAS app (unencrypted ads, encrypted live stream)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted live stream of a linear TV service, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts (which are not encrypted) are shown to the viewer</li> <li>• The substitution process is carried-out server-side by stitching-server but a broadcast-related application sends ad requests and/or reports tracking events to an ad server (RRA: request and reporting application)</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Payout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Means for scheduling ad requests client-side to be addressed/specified</li> <li>• Communication between RRA and stitching server to be addressed/specified</li> <li>• Terminal requirements to be addressed</li> </ul>

## 6.8. Server-side Ad Substitution with client-side tracking by a DAS app (encrypted ads, encrypted live stream)

<b>Title</b>	<b>Server-side Ad Substitution with client-side tracking by a DAS app (encrypted ads, encrypted live stream)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted live stream of a linear TV service, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts (which are also encrypted) are shown to the viewer</li> <li>• The substitution process is carried-out server-side by stitching-server but a broadcast-related application sends ad requests and/or reports tracking events to an ad server (RRA: request and reporting application)</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Payout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Means for scheduling ad requests client-side to be addressed/specified</li> <li>• Communication between RRA and stitching server to be addressed/specified</li> <li>• Terminal requirements to be addressed</li> </ul>

## 6.9. App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (unicast)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (unicast)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a unicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• One or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the live stream after the corresponding A/V files have been downloaded completely onto the receiving device</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application and also sends ad requests and reports tracking events to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

## 6.10. App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (unicast, encrypted)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (unicast, encrypted)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted unicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• One or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the encrypted live stream after the corresponding unencrypted A/V files have been downloaded completely onto the receiving device</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application and also sends ad requests and reports tracking events to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

## 6.11. App-controlled Client-side Ad Substitution /w streamed substitution adverts (unicast)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w streamed substitution adverts (unicast)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a unicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• A DASH stream containing one or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the live stream</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application and also sends ad requests and reports tracking events to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

## 6.12. App-controlled Client-side Ad Substitution /w streamed substitution adverts (unicast, encrypted)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w streamed substitution adverts (unicast, encrypted)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted unicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• An unencrypted DASH stream containing one or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the encrypted live stream</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

### 6.13. App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (multicast)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (multicast)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a multicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• One or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the live stream after the corresponding A/V files have been downloaded completely onto the receiving device</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application and also sends ad requests and reports tracking events to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

## 6.14. App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (multicast, encrypted)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w pre-fetched substitution adverts (multicast, encrypted)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted multicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• One or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the encrypted live stream after the corresponding unencrypted A/V files have been downloaded completely onto the receiving device</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application and also sends ad requests and reports tracking events to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

## 6.15. App-controlled Client-side Ad Substitution /w streamed substitution adverts (multicast)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w streamed substitution adverts (multicast)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a multicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• A DASH stream containing one or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the live stream</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application and also sends ad requests and reports tracking events to an ad server</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

## 6.16. App-controlled Client-side Ad Substitution /w streamed substitution adverts (multicast, encrypted)

<b>Title</b>	<b>App-controlled Client-side Ad Substitution /w streamed substitution adverts (multicast, encrypted)</b>
<b>Context &amp; Constraints</b>	A service-discovery mechanism for interactive, broadcast-related services (HbbTV) does exist for DVB-I
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an encrypted multicast live stream of a linear TV service, which contains ad breaks consisting of one or several broadcast adverts</li> <li>• An unencrypted DASH stream containing one or several targeted substitution adverts are shown to the viewer instead of the advert(s) contained in the encrypted live stream</li> <li>• The substitution process is carried-out client-side and executed by a broadcast-related DAS application</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Gap analysis for enabling HbbTV in a DVB-I context required</li> <li>• Signalling means (headend to receiver) for pre-announcement of placement opportunities to be specified</li> <li>• Terminal requirements to be addressed <ul style="list-style-type: none"> <li>○ For single-decoder client devices, stream conditioning of the linear TV service to be specified to facilitate switching between linear TV service and substituted advert</li> </ul> </li> </ul>

## 6.17. Deterministic server-side tracking and impression counts for server-side advert insertion and substitution (applicable to all server-side tracking use cases)

<b>Title</b>	<b>Deterministic server-side tracking and impression counts for server-side advert insertion and substitution (applicable to all server-side tracking use cases e.g. RTL1, 2 and 3)</b>
<b>Context &amp; Constraints</b>	
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• Currently, the point at which impression counts and tracking are emitted by server-side manifest manipulators can vary by implementation.</li> <li>• When impression counts are emitted by server-side manifest manipulators there is no guarantee that the equivalent point of the advertising media has actually been presented to the viewer.</li> <li>• So that broadcasters and advertisers can reliably trade on a valid metric, a deterministic (or at least more consistent) method for tracking should be defined. The definition may include agreed timings for signalling and constraints applied to playback.</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	

## 6.18. Support for viewer responses in server-side advert insertion and substitution.

<b>Title</b>	<b>Support for viewer responses in server-side advert insertion and substitution.</b>
<b>Context &amp; Constraints</b>	The context is interaction via a DAS app.
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches an advert inserted by server-side manifest manipulation.</li> <li>• The viewer is prompted by the advertising media to respond to an action (e.g. button presses or screen tap).</li> <li>• The action is related to the advert as a whole (traditional 'clickthrough') or related to specific objects presented in the video frames.</li> <li>• When actioned the viewer is presented with more information about the advert of the object selected.</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for "CM-TA"</b>	<ul style="list-style-type: none"> <li>• Define how response resources (URLs) are signalled in the manifest.</li> <li>• Define how image-mapping data is signalled in the manifest.</li> <li>• Recommend how response resources are actioned by the client device.</li> </ul>
<b>CM-TA Source &amp; Owner</b>	

## 6.19. CSAS/SSAS admixtures on the same service

<b>Title</b>	<b>CSAS/SSAS admixtures on the same service</b>
<b>Context &amp; Constraints</b>	Enable broadcaster to correctly manage relation/priority of different means for presenting targeted ads, so that the desired user experience can be achieved, and targeted campaigns can be delivered across different types of inventory.
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• Terminal is set to perform pre-roll ad. Insertion on channel change</li> <li>• Terminal perform a channel change to a channel where is going to run a SSAI/SSAS</li> <li>• Conflict to be managed</li> </ul>
<b>Business issue (if any)</b>	<ul style="list-style-type: none"> <li>• technical fragmentation may lead to fragmentation of inventory</li> <li>• lack of control may lead to: <ul style="list-style-type: none"> <li>○ undefined user behaviour</li> <li>○ undesired Terminal behaviour from a B'caster PoV</li> </ul> </li> </ul>
<b>Activities for "CM-TA"</b>	<ul style="list-style-type: none"> <li>• terminal requirements to be addressed if any (e.g.: provision of a standardized API that allows a broadcaster to manage and control the several technical means for presenting targeted ads)</li> </ul>

## 6.20. Server-side Ad Substitution with ad break extension

<b>Title</b>	<b>Server-side Ad Substitution with ad break extension</b>
<b>Context &amp; Constraints</b>	Live sports in OTT or hybrid broadcast broadband context
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a live stream of sports, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• The stream is a live DASH stream</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts are shown to the viewer</li> <li>• The substitution process is carried-out server-side by a stitching server, which also sends ad requests and reports tracking events (per session and per unique device) to an ad server</li> <li>• The broadcaster decides that the live sports resumption is postponed and the ad break can be extended</li> <li>• The ad break is extended while the user is watching</li> <li>• The main content resumes when the sport match is resuming and the extended ad break is terminated</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Playout to headend signalling for pre-announcement of placement opportunities to be specified, including the time in advance of the live edge to announce the change</li> <li>• Playout to headend signalling extension of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Guidance on communication between stitching server and ad server to be given</li> <li>• Terminal requirements to be addressed, e.g. transitions from ad-to-main content, processing of reporting events in the extended ad, encryption changes</li> </ul>

## 6.21. Server-side Ad Substitution with ad break early termination

<b>Title</b>	<b>Server-side Ad Substitution with ad break early termination</b>
<b>Context &amp; Constraints</b>	Live sports in OTT or hybrid broadcast broadband context
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A viewer watches a live stream of sports, which initially contained ad breaks consisting of one or several broadcast adverts</li> <li>• The stream is a live DASH stream</li> <li>• Instead of the broadcast adverts one or several targeted substitution adverts are shown to the viewer</li> <li>• The substitution process is carried-out server-side by a stitching server, which also sends ad requests and reports tracking events (per session and per unique device) to an ad server</li> <li>• The broadcaster decides that the live sports resumption is earlier than expected and the ad break can be terminated</li> <li>• The ad break is terminated early, possibly during the advert, and the viewer does not miss the start of the sport event live content</li> <li>• The ad break is terminated early, at the boundary of the last advert, and the viewer does not miss the start of the sport event live content</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Payout to headend signalling for pre-announcement of placement opportunities to be specified</li> <li>• Payout to headend signalling for early termination of placement opportunities to be specified</li> <li>• Stream conditioning for Server-side Ad Substitution to be specified</li> <li>• Guidance on communication between stitching server and ad server to be given</li> <li>• Terminal requirements to be addressed, e.g. transitions from ad-to-main content, processing of reporting events in the extended ad, encryption changes</li> </ul>

## 6.22. Device Identification for Server-Side and Client-Side Ad Substitution

<b>Title</b>	Device Identification for Server-Side and Client-Side Ad Substitution
<b>Context &amp; Constraints</b>	<p>Digital ad serving relies upon a consistent and reliable way to identify receivers. Distinctive identifiers are used to control ad frequency and ad creative rotations. A lack of so called "frequency capping" can result in an unfavourable and frustrating user experience. Further, distinctive identifiers allow advertisers to show personalised adverts to make them more relevant to the user.</p> <p>Therefore, targeting of adverts in general and user-friendly DAS in particular requires a privacy-safe and robust way for device identification, which can be used during ad selection. Respecting the user's privacy settings is crucial and distinctive identifiers should only be passed if the user allows it.</p>
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A user wants to initialise a live stream</li> <li>• DAS app can request to read distinctive identifier from terminal</li> <li>• Terminal honours user privacy setting</li> <li>• If allowed, the distinctive identifier is passed as part of the stream request (in a safe manner e.g. by using https) for later ad decisioning</li> <li>• A receiver should provide an opt-in/opt-out management to the users. Also the user can reset the distinctive identifier.</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for "CM-TA"</b>	<ul style="list-style-type: none"> <li>• Review the DVB-I and DVB-DASH Specs and validate it with the distinctive identifier definition in HbbTV 12.1.5</li> <li>• Review IAB guidelines for device identification to assess compatibility [9]</li> <li>• Based on the conclusions requirements to terminal should be addressed</li> </ul>

## 6.23. DAS app and content identification

<b>Title</b>	DAS app and content identification
<b>Context &amp; Constraints</b>	<p>In programmatic advertising, advertisers need to identify the environment from where they buy ad inventory. This is done for targeting purposes but also to guarantee brand safety and prevent fraud.</p> <p>In OTT environments, the application app store url is used to uniquely identified the environment. For this purpose the IAB has provided <a href="#">guidelines for OTT/CTV Store Assigned App Identification</a>.</p> <p>Provide a standardised way how DAS applications and its content is identified.</p>
<b>Description (story)</b>	<ul style="list-style-type: none"> <li>• A user wants to initialises a linear stream</li> <li>• DAS app reads metadata from DVB or DVB-I/DASH stream</li> <li>• Metadata could include the name of DAS application, broadcaster and channel/service</li> <li>• Metadata can be submitted as parameter to server-side components</li> </ul>
<b>Business issue (if any)</b>	
<b>Activities for “CM-TA”</b>	<ul style="list-style-type: none"> <li>• Discuss if IAB guidelines for app identification should be embraced [10]</li> <li>• Specify how DVB streams and DVB-I services can be identified</li> <li>• Define further requirements around discoverability of DVB-I services</li> </ul>

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## 7. History

Ref	Month Year	Milestone
C103	November 2022	BlueBook publication (Internal document CM2052r1)