



DVB Content Delivery Technologies

DVB-I and DVB-TA Overview

Peter Lanigan – TP Vision / Chair of DVB-CM-I

24th February 2021

DVB Content Delivery Technologies

- DVB has provided the fundamental standards used to deliver digital TV services for more than two decades, including (but not limited to):
 - DVB-T, C and S – transmission over terrestrial, cable and satellite networks
 - DVB-SI – signalling and metadata
 - DVB-AVC – audio and video coding
- More recently, DVB has supported IP technologies with standards such as **DVB-DASH**
- **HbbTV** has built on these technologies
- This presentation looks at newer DVB standards and how they relate to the existing ecosystem:
 - DVB-I – IP signalling and delivery
 - DVB-TA – Targeted Advertising

What is DVB-I?

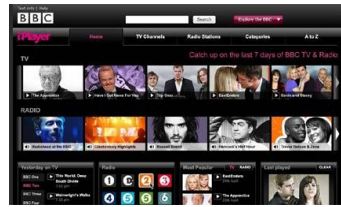
- DVB already has **DVB-T** (terrestrial), **DVB-C** (cable) and **DVB-S** (satellite)
- **DVB-I** is a new addition, where the I stands for **Internet**
- **DVB-I** delivers services over the Internet to devices with broadband access
 - ...meaning “over the top”
 - ...but also over managed networks, with operator support
- The **user experience** of DVB-I can be similar to DVB-T, C and S
 - ... and DVB-I can be used **in combination** with DVB-T, C and S
- **All devices** with Internet access are in scope, not just TVs and STBs

Why is DVB-I needed?

- The Internet has transformed how we access TV...

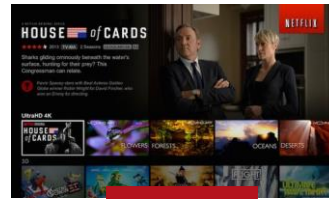


Video on
web sites



BBC iPlayer

Catch-up TV



NETFLIX

Global VoD services
as major original
content producers



UGC, channels, “stars”



sky go NOW TV

Super-simple OTT PayTV

Sky, Sky Go and Now TV are trademarks
owned by the Sky group of companies.



Why is DVB-I needed?

- These services are deployed as **apps**
- Apps allowed **innovative services** to develop **outside the traditional processes** of the media industry, but...
- **Users:**
 - Content is segregated into independent apps
 - Not all apps are on all platforms
- **Broadcasters and Service Providers:**
 - Apps need to be provided and maintained for multiple platforms
 - How to get your app noticed?
 - How to combine with and extend existing broadcast services?
- **Manufacturers:**
 - Many apps to support and certify
 - Hard to provide a consistent user experience
 - Multiple solutions to same problem

Why is DVB-I needed?

- **DVB-I** does for **IP services** what DVB-T/C/S do for broadcast
- Services are signalled and distributed in a **standardised** manner, so a **specific app is not required**
- A receiver can present an **integrated list of services and content**, including DVB-I and broadcast services
- **Users** don't have to know or care whether a service arrives via broadcast or IP
- **Broadcasters** can deploy a service once to a wide range of devices
- **Broadcasters** can create a single offering including both broadcast and IP services
- **Manufacturers** can make a single consistent user experience for DVB-I (and broadcast) services

DVB-I – Areas of Applicability



CM-10003

Commercial Requirements for DVB-I Services

DVB CM-I Group

Version: 0.0.31
Creation Date: 05.01.2018
Revision Date: 19.10.2018

Date	Version	Remarks
2018-01-09	0.0.0	Initial input for January 10 th face to face meeting
2018-01-10	0.0.1	Updates based on discussions in the 10 th January 10 th
2018-02-22	0.0.2	Updates based on CM-I phone conference #5, 2018-01-22
2018-02-26	0.0.3	Updates based on CM-I phone conference #7, 2018-02-26
2018-03-21	0.0.4	Integrated CM-10021r1 as agreed
2018-03-28	0.0.5	Edits in March 28 th phone conference and actions afterwards
2018-04-05	0.0.6	Integrated Mobile Centric Use Case (CM-10022r5), updated Broadcaster Centric Use Case (CM-10017r7), requirements from IPTV Service Provider Use Case (CM-10030r1) and TV manufacturer use-case (CM-10039). (Description of IPTV Service Provider Use Case still to do)
2018-05-03	0.0.7	Integrated CM-10045 as agreed in May 3 rd phone conference
2018-05-16	0.0.8	Integrated updates from Chris Roose (to 2.5, 2.4, 2.3), Thomas Stockhammer (2.6, 2.11), Paul Szucs+Davide Milanesio (2.8), Frank Herrmann (2.7, 2.1), Consolidated 2.3, 2.10 and 2.12 (action 13-6). Removed requirements from annex 4 which Chris, Thomas, Paul+Davide and Frank merged into the main body. Merged more requirements from annex 4 into the main body.
2018-05-17	0.0.9	Completed merging requirements from annex 4 into the main body.
2018-05-17	0.0.10	Edits from May 17 th phone conference
2018-05-24	0.0.11	Live edits from May 24 th phone conference.
2018-05-29	0.0.12	Fixed heading and requirement numbering. Other purely editorials.
2018-05-30	0.0.13	Live edits from May 30 th phone conference
2018-05-31	0.0.14	Edits from June 4 th face to face meeting
2018-06-07	0.0.15	Editorial clean-ups following June 4 th meeting, edits from June 7 th phone conference.
2018-06-11	0.0.16	Proposed informative text for the Summary and sections 1.1, 1.3 and 1.6.
2018-06-11	0.0.17	Live edits from June 11 th phone conference
2018-06-13	0.0.18	Updates to section 1 following comments from Davide Milanesio
2018-06-13	0.0.19	Live edits from June 13 th phone conference
2018-06-14	0.0.20	Live edits from June 14 th phone conference
2018-06-15	0.0.21	Integrated CM-10022r5 – mobile centric use-case – which had previously been omitted. General editorial clean-ups as agreed.

DVB CM-10003

© DVB Project

Commercial Requirements – areas of applicability:

- Any device with an internet connection and a media player
- May or may not have a DVB tuner
- Works over broadband, wifi, mobile networks, ...
- OTT or with network operator support
- Can be received with a standard receiver or a downloaded application



DVB-I – Service Types



CM-10003

Commercial Requirements for DVB-I Services

DVB CM-I Group

Version: 0.0.31
Creation Date: 05.01.2018
Revision Date: 19.10.2018

Date	Version	Remarks
2018-01-09	0.0.0	Initial input for January 10 th face to face meeting
2018-01-10	0.0.1	Updates based on discussions in the 1 st January 10 th
2018-02-22	0.0.2	Updates based on CM-I phone conference #5, 2018-01-22
2018-02-26	0.0.3	Updates based on CM-I phone conference #7, 2018-02-26
2018-03-21	0.0.4	Integrated CM-10021r1 as agreed
2018-03-28	0.0.5	Edits in March 26 th phone conference and actions afterwards
2018-04-05	0.0.6	Integrated Mobile Centre Use Case (CM-10022r5), updated Broadcaster Centre Use Case (CM-10017r7), requirements from IPTV Service Provider Use Case (CM-10030r1) and TV manufacturer use-case (CM-10035). (Description of IPTV Service Provider Use Case still to do)
2018-05-03	0.0.7	Integrated CM-10045 as agreed in May 3 rd phone conference
2018-05-16	0.0.8	Integrated updates from Chris Roope (to 2.5, 2.4, 2.3), Thomas Stockhammer (2.6, 2.11), Paul Szucs+Davide Milanesio (2.8), Frank Heermann (2.7, 2.1), Consolidated 2.3, 2.10 and 2.12 (action 13-6). Removed requirements from annex 4 which Chris, Thomas, Paul+Davide and Frank merged into the main body. Merged more requirements from annex 4 into the main body.
2018-05-17	0.0.9	Completed merging requirements from annex 4 into the main body.
2018-05-17	0.0.10	Edits from May 17 th phone conference
2018-05-24	0.0.11	Live edits from May 24 th phone conference.
2018-05-29	0.0.12	Fixed heading and requirement numbering. Other purely editorials.
2018-05-30	0.0.13	Live edits from May 30 th phone conference
2018-05-31	0.0.14	Edits from June 4 th face to face meeting
2018-06-07	0.0.15	Editorial clean-ups following June 4 th meeting, edits from June phone conference.
2018-06-11	0.0.16	Proposed informative text for the Summary and sections 1.1, 1.3 and 1.6.
2018-06-11	0.0.17	Live edits from June 11 th phone conference
2018-06-13	0.0.18	Updates to section 1 following comments from Davide Milanesio
2018-06-13	0.0.19	Live edits from June 13 th phone conference
2018-06-14	0.0.20	Live edits from June 14 th phone conference.
2018-06-15	0.0.21	Integrated CM-10022r5 – mobile centric use-case – which had previously been omitted. General editorial clean-ups as agreed.

DVB CM-10003

© DVB Project

Commercial Requirements – service types:

- Broadcast-like:
 - Linear TV
 - Free and pay TV
 - A/V, subtitles, associated applications, ...
 - Parental control
- Specific to IP:
 - Video on Demand
 - Personalized services
 - “Scheduled VoD”
- DVB-I service offerings can be stand alone or integrated with broadcast



DVB-I – User Experience



CM-10003

Commercial Requirements for DVB-I Services

DVB CM-I Group

Version: 0.0.31
 Creation Date: 05.01.2018
 Revision Date: 19.10.2018

Date	Version	Remarks
2018-01-09	0.0.0	Initial input for January 10 th face to face meeting
2018-01-10	0.0.1	Updates based on discussions in the 10 th January 10 th
2018-02-22	0.0.2	Updates based on CM-I phone conference #5, 2018-01-22
2018-02-26	0.0.3	Updates based on CM-I phone conference #7, 2018-02-26
2018-03-21	0.0.4	Integrated CM-10021r1 as agreed
2018-03-28	0.0.5	Edits in March 26 th phone conference and actions afterwards
2018-04-05	0.0.6	Integrated Mobile Centric Use Case (CM-10022r5), updated Broadcaster Centric Use Case (CM-10017r7), requirements from IPTV Service Provider Use Case (CM-10030r1) and TV manufacturer use-case (CM-10035). (Description of IPTV Service Provider Use Case still TBD)
2018-05-03	0.0.7	Integrated CM-10045 as agreed in May 3 rd phone conference
2018-05-16	0.0.8	Integrated updates from Chris Roose (to 2.5, 2.4, 2.3), Thomas Stockhammer (2.6, 2.11), Paul Szucs+Davide Milanesio (2.8), Frank Heermann (2.7, 2.1), Consolidated 2.3, 2.10 and 2.12 (action 13-6). Removed requirements from annex 4 which Chris, Thomas, Paul+Davide and Frank merged into the main body. Merged more requirements from annex 4 into the main body.
2018-05-17	0.0.9	Completed merging requirements from annex 4 into the main body.
2018-05-17	0.0.10	Edits from May 17 th phone conference
2018-05-24	0.0.11	Live edits from May 24 th phone conference.
2018-05-29	0.0.12	Fixed heading and requirement numbering. Other purely editorials.
2018-05-30	0.0.13	Live edits from May 30 th phone conference
2018-05-31	0.0.14	Edits from June 4 th face to face meeting
2018-06-07	0.0.15	Editorial clean-ups following June 4 th meeting, edits from June 7 th phone conference.
2018-06-11	0.0.16	Proposed informative text for the Summary and sections 1.1, 1.3 and 1.6.
2018-06-11	0.0.17	Live edits from June 11 th phone conference
2018-06-13	0.0.18	Updates to section 1 following comments from Davide Milanesio
2018-06-13	0.0.19	Live edits from June 13 th phone conference
2018-06-14	0.0.20	Live edits from June 14 th phone conference
2018-06-15	0.0.21	Integrated CM-10022r5 – mobile centric use-case – which had previously been omitted. General editorial clean-ups as agreed.

DVB CM-10003

© DVB Project

Commercial Requirements – user experience:

- Can be similar user experience to DVB-T/C/S
- Navigation possible with channel list and programme guide (which may include broadcast and IP services)
- Zapping times between linear channels similar to broadcast



DVB-I – Service Discovery and Trust



CM-10003

Commercial Requirements for DVB-I Services

DVB CM-I Group

Version: 0.0.31
Creation Date: 05.01.2018
Revision Date: 19.10.2018

Date	Version	Remarks
2018-01-09	0.0.0	Initial input for January 10 th face to face meeting
2018-01-10	0.0.1	Updates based on discussions in the 1 st January 10 th
2018-02-22	0.0.2	Updates based on CM-I phone conference #5, 2018-01-22
2018-02-26	0.0.3	Updates based on CM-I phone conference #7, 2018-02-26
2018-03-21	0.0.4	Integrated CM-1002111 as agreed
2018-03-28	0.0.5	Edits in March 26 th phone conference and actions afterwards
2018-04-05	0.0.6	Integrated Mobile centric Use Case (CM-1002215), updated Broadcaster Centric Use Case (CM-1001177), requirements from IPTV Service Provider Use Case (CM-1003011) and TV manufacturer use-case (CM-10039). (Description of IPTV Service Provider Use Case still to do)
2018-05-03	0.0.7	Integrated CM-100245 as agreed in May 3 rd phone conference
2018-05-16	0.0.8	Integrated updates from Chris Rouse (to 2.5, 2.4, 2.3), Thomas Stockhammer (2.6, 2.11), Paul Szucs+Davide Milanesio (2.8), Frank Herrmann (2.7, 2.1), Consolidated 2.3, 2.10 and 2.12 (action 13-6). Removed requirements from annex 4 which Chris, Thomas, Paul+Davide and Frank merged into the main body. Merged more requirements from annex 4 into the main body.
2018-05-17	0.0.9	Completed merging requirements from annex 4 into the main body.
2018-05-17	0.0.10	Edits from May 17 th phone conference
2018-05-24	0.0.11	Live edits from May 24 th phone conference.
2018-05-29	0.0.12	Fixed heading and requirement numbering. Other purely editorials.
2018-05-30	0.0.13	Live edits from May 30 th phone conference
2018-05-31	0.0.14	Edits from June 4 th face to face meeting
2018-06-07	0.0.15	Editorial clean-ups following June 4 th meeting, edits from June phone conference.
2018-06-11	0.0.16	Proposed informative text for the Summary and sections 1.1, 1.3 and 1.6.
2018-06-11	0.0.17	Live edits from June 11 th phone conference
2018-06-13	0.0.18	Updates to section 1 following comments from Davide Milanesio
2018-06-13	0.0.19	Live edits from June 13 th phone conference
2018-06-14	0.0.20	Live edits from June 14 th phone conference.
2018-06-15	0.0.21	Integrated CM-1002215 – mobile centric use-case – which had previously been omitted. General editorial clean-ups as agreed.

DVB CM-10003

© DVB Project

Commercial Requirements – service discovery and trust:

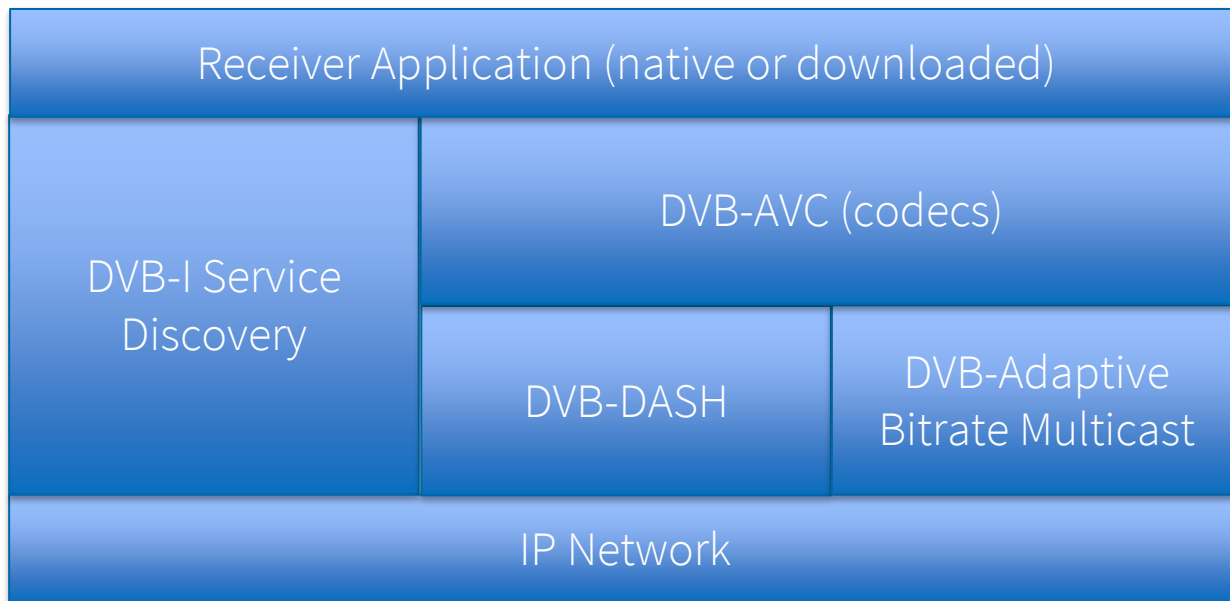
- Who provides service lists?
- How can a receiver find relevant services?
 - Many thousands of channels may be technically available to a user
- How are legal and trusted services identified?
- Not only technical, but also commercial and legal problem
- DVB-I provides the technical means for these problems to be solved



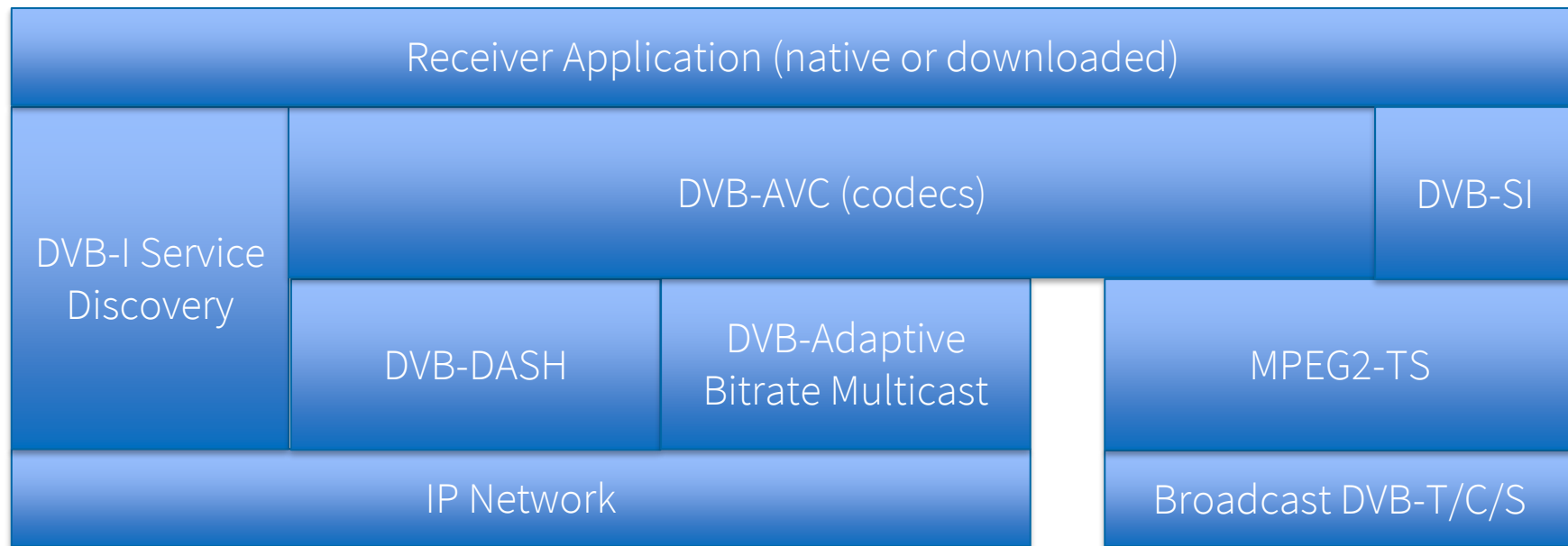
DVB-I Specifications

- **DVB-I Service Discovery and Programme Metadata** – published November 2019, first revision July 2020 (ETSI TS 103 770 / A177r1)
- And **DVB-I** builds on:
- **DVB-DASH** (ETSI TS 103 285)
 - Profile of MPEG-DASH targeting delivery of DVB services
 - Low latency support added in June 2019, better supporting linear and live services
- **DVB ABR Multicast** (ETSI TS 103 769)
 - Efficient delivery of linear AV services over operator network to large numbers of users
 - Transparent to receivers
 - First version published in November 2020, updates ongoing
- Other DVB specifications, e.g. **DVB Video and Audio Coding Formats** (ETSI TS 101 154)
 - Support for services from SD, HD, up to UHD, HDR, dynamic metadata, advanced audio, etc
 - Subtitles, multiple audio tracks, etc

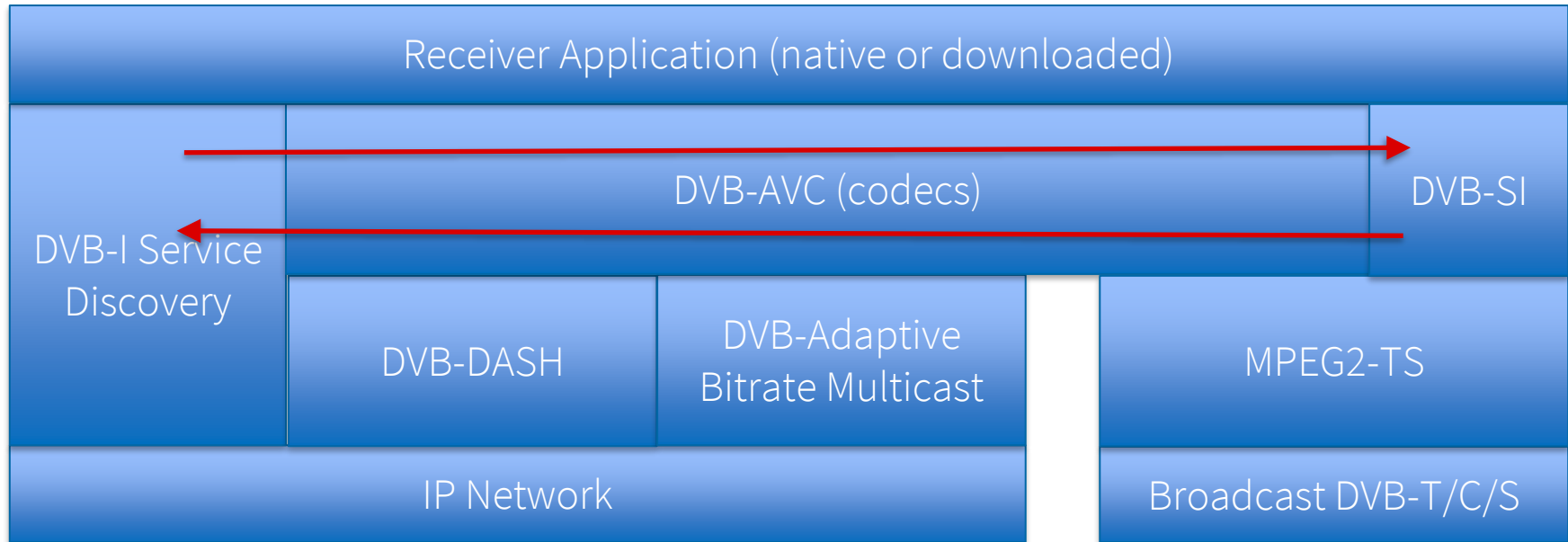
DVB-I Layers – Pure IP Deployment



DVB-I Layers – Hybrid Case

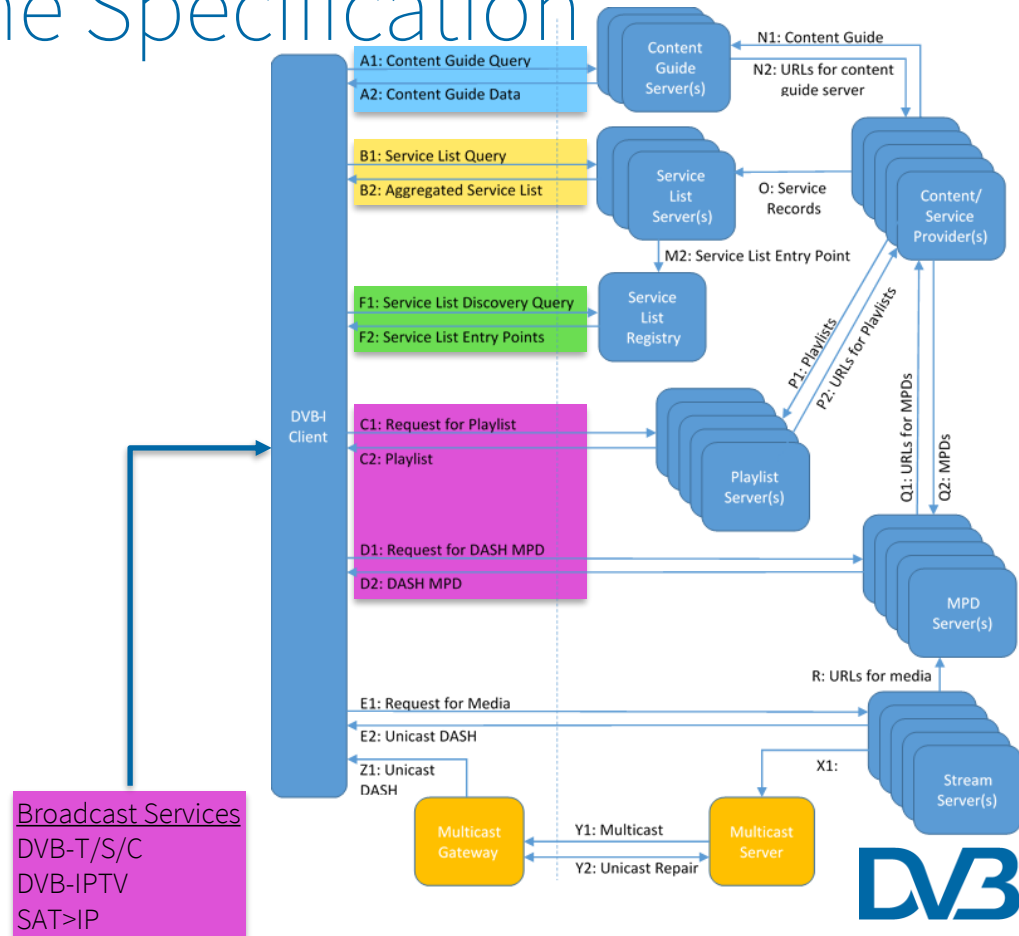


DVB-I Layers – Hybrid Case



DVB-I - Aspects of the Specification

- Service List Discovery
- Service Lists
- Content Metadata
- Media Representations



Testing, Validation and Verification

- Open source **DVB-I Reference client** available:
 - <https://dvb.org/specifications/verification-validation/dvb-i/>
- Examples of service lists and content guide metadata
- Content and metadata validators
- *ffmpeg* open source encoder extended to support LL-DASH (in co-operation with DASH-IF)



DVB-TA – Targeted Advertising

- DVB published a new **Targeted Advertising** specification in 2020
- Supports the dynamic substitution of adverts in linear broadcast TV
- Adverts are delivered via IP and can be targeted based on various criteria
- A178-1 / draft TS 103 752-1: Signalling
 - Signalling towards receiver (including to an HbbTV application)
- ETSI TS 103 752-2: Interfacing and Preparation
 - Interfacing to an advert decisioning service, and preparation of media
- These specifications are used by HbbTV's Targeted Advertising solution

DVB-TA for DVB-I

- DVB recently approved Commercial Requirements for extensions to DVB-TA and DVB-I to support Targeted Advertising on DVB-I services
- The user experience will remain the same, but implementation can be optimised based on characteristics of DVB-I services
- Technical work is now starting

DVB-I for 5G

- DVB-I is usable on any IP network
- There were specific Commercial Requirements for support of mobile networks
- Some additional CRs are being developed to ensure DVB-I works seamlessly with 5G in three scenarios:
 - DVB-I services over “5G Unicast”
 - DVB-I services over “5G Broadcast”
 - DVB-I services over “5G Fixed Wireless Access”

Conclusions



DVB-I enables the delivery of DVB services over the Internet, supplementing DVB-T/C/S and also providing a path to 5G
DVB-TA gives broadcasters additional options to monetise their services

Services:

- reach more users...
- on more devices...
- and users without access to traditional broadcast reception

Users:

- can access more services
- don't need to know or care whether a service reaches them via DVB-T/C/S or DVB-I

DVB:

- supports its members with new deployment options
- brings opportunities support new parts of the industry
- extends DVB's relevance outside the traditional broadcast domain

DVB-I and DVB-TA are available now!

